SUPPLEMENT "B"

TO

H. O. No. 252

NAVAL AIR PILOT

GREENLAND—ICELAND

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WEATHER SUMMARY

UNITED STATES NAVY DEPARTMENT

HYDROGRAPHIC OFFICE

RESTRICTED

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H. O. No. 252

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WEATHER SUMMARY

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WIND FORCE AND STATE OF SEA SURFACE WITH SPECIFICATIONS AND EQUIVALENTS

Beaufort No.	Description of wind	Sea area			Land area	Nautical miles per hour	Terms used in U. S. Weather Bureau forecasts
		State of sea surface	Description of sea	Scale			
0	Calm	Sea like a mirror—smooth	Glassy-calm	0	Calm; smoke rises vertically	Less than 1	
1	Light air	Ripples with the appearance of scales are formed but without foam crests.	Rippled	1	Direction of wind shown by smoke drift but not by wind vanes.	1–3	Light.
2	Light breeze	Small wavelets, still short but more pronounced. Crests have a glassy appearance and do not break.	Smooth	2	Wind felt on face; leaves rustle; ordinary vane moved by wind.	4–6	
3	Gentle breeze	Large wavelets; crests begin to break; foam is not white but of glassy appearance, perhaps scattered whitecaps.			Leaves and small twigs in constant motion; wind extends light flag.	7–10	Gentle.
4	Moderate breeze	Small waves, becoming longer; fairly frequent whitecaps.	Slight	3	Raises dust and loose paper; small branches are moved.	11–16	Moderate.
5	Fresh breeze	Moderate waves, taking a more pronounced long form; many whitecaps are formed. (Chance of some spray.)	Moderate	4	Small trees in leaf begin to sway; crested wavelets form on inland waters.	17–21	Fresh.
6	Strong breeze	Large waves begin to form; white foam crests are more extensive everywhere. (Probably some spray.)	Rough	5	Large branches in motion; whistling heard in telegraph wires; umbrellas used with difficulty.	22–27	Strong.
7	Moderate gale (high wind).	Sea piles up and white foam from breaking waves begins to be blown in streaks along the direction of the wind.	Very rough	6	Whole trees in motion; inconvenience felt in walking against the wind.	28–33	
8	Fresh gale	Moderately high waves of greater length; edges of crest begin to break into the spindrift. The foam is blown in well-marked streaks along the direction of the wind.			Breaks twigs off trees; generally impedes progress.	34–40	Gale.
9	Strong gale	High waves. Dense streaks of foam along the direction of the wind. Sea begins to "roll." Spray may affect visibility.	High	7	Slight structural damage occurs.	41–47	
10	Whole gale (heavy gale).	Very high waves with long overhanging crests. The resulting foam, in great patches, is blown in dense white streaks along the direction of the wind. On the whole, the surface of the sea takes a white appearance. The rolling of the sea becomes heavy and shocklike. Visibility affected.	Very high	8	Seldom experienced inland; trees uprooted; considerable structural damage occurs.	48–55	Whole gale.
11	Storm	Exceptionally high waves (small and medium-sized ships might be for a time lost to view behind the waves). The sea is completely covered with long white patches of foam along the direction of the wind. Everywhere the edges of the wave crests are blown into froth. Visibility affected.	Phenomenal [1]	9	Very rarely experienced; accompanied by widespread damage.	56–65	
12	Hurricane	The air is filled with foam and spray. Sea completely white with driving spray; visibility very seriously affected.				Above 65	Hurricane.

[1] As might exist at the center of a hurricane.

WINDS AND WEATHER OF THE GREENLAND-ICELAND REGION AND ADJACENT NORTH ATLANTIC

General remarks.—This summary is confined to the region from Davis Strait to Greenland Sea and adjacent northern part of North Atlantic Ocean. For small parts of the Great North we may consider the weather climatically, since observations are of so extended a nature that average weather, that is, climate, has become well-founded. The Arctic, as well as the Temperate Zone, is one of weather extremes. Where we know some measure of these extremes, as indicated by many years of observations, and can compute fair averages as reference points, we have a good idea of weather possibilities. Thus, for locations on the shore of Greenland and Iceland, we have a fairly good idea of climatic conditions, at least statistically. For interior Greenland and for those sea areas crossed sparsely, or only sporadically, by exploring or other vessels, we have only such scattered weather notations or observations as have been taken and made available. The meteorological data gathered by well-equipped scientific expeditions have provided invaluable weather material, and honor may well be given to those intrepid explorers who have braved the cold, the fog, the storms, and the ice of the Arctic, and have not always found it unfriendly.

Pilot charts.—Additional information concerning weather may be obtained from the Pilot Charts of the North Atlantic Ocean, Nos. 1400, 1400A, 1400B, and 1400C published by the Hydrographic Office.

Atmospheric pressure.—For the colder zones of the Northern Hemisphere there are two great regions of low pressure, both lying mainly over the oceans. In the North Pacific the Aleutian LOW is centered, according to an average of records, between about the 50th and 55th parallels of latitude, not far from midway of the Aleutian Chain. It is by no means a fixed LOW, since it forms largely in the colder season, when traveling cyclones are deepest and most numerous, and often in a winter month may be most fully developed in the Gulf of Alaska or even toward the westward of the Aleutians.

In the North Atlantic the Icelandic LOW fills a similar role, but its average center is higher in latitude than the Pacific LOW, since the principal minimum extends from western Iceland across Denmark Strait, embracing the east coast of Greenland from Angmagssalik, near latitude 66° N., to below the island's southern tip, and extending westward as a spur into Davis Strait. A secondary LOW exists northeast of Iceland over the great eddy of the Greenland Sea.

The average barometer in the Icelandic LOW is lowest in December and January, reading 29.47 inches at the Icelandic stations of Vestmannaeyjar and Stykkisholmur and at Ivigtut and Godthaab on the Greenland west coast. At Angmagssalik, on the east coast of Greenland, the December mean is 29.44 inches, which is the lowest recorded for any of the coastal region. Therefore, from coastal data, an isobar of 29.50 inches surrounds a considerable area in December and January from western Iceland to Davis Strait, with pressure for the interior of extreme southern Greenland probably low, but little known from an average standpoint. A high-pressure situation overlies the central and northern Greenland ice cap, according to such observations as have been made there, with the "vortex of the anticyclone . . . central somewhere north of latitude 67° N."

About the center of the Icelandic LOW, pressure rises slowly in all directions except perhaps into the Greenland Sea, with its secondary depression. At Upernivik, in the winter months considered, the mean barometer rises to 29.71 inches. On eastern coastal Iceland the average pressure is .06 inch higher than on the western.

By February the LOW begins to fill, and ordinarily by May the average barometer is highest over all the region, attaining 30.00 inches or slightly over in latitudes as high as Upernivik, and Jan Mayen, but only to about 29.90 to 29.97 inches over Iceland and southern Greenland. Thereafter it continues to fall until it reaches the December minimum. From spring to early autumn, therefore, the LOW is shallow and the isobaric gradients are for the most part weak in all directions. In winter, however, when the Icelandic LOW is deepest, pressure is high over the archipelago of northern North America, therefore, gradients tend to be rather steep in that direction, as well as southward into the Atlantic.

In the movements of traveling cyclones and anticyclones across these northern regions, extremely high and low pressure readings are sometimes

recorded. At Ivigtut, for example, the record high pressure is 30.92 inches, and the lowest 27.91. At Upernivik the range is from 31.10 to 29.32. The extreme low barometer at Jakobshavn is 27.34 inches. The most astonishing low reading of all, however, was 27.04 inches observed at Julienehaab. An equally astonishing high reading of 31.51 inches has been observed at Myggbukta on the east coast.

In Iceland the barometer extremes in a record of 28 years at Reykjavik were 31.06 and 27.44 inches. The absolute extremes at Jan Mayen, 30.86 and 27.91 inches.

Cyclonic storms.—The Icelandic LOW is the heart of the semipermanent cyclone region of the northern Atlantic, and it is by that fact that one may well expect a great number of the colder season traveling storms will tend to move toward their core of attraction. As the LOW shifts a great deal between Davis Strait and Norway, on the one hand, and between latitudes about 50° and 65° to 70° N. on the other, we may readily surmise for its lower latitude developments that it is fed by an inflow of great Atlantic depressions lying over the northern steamship routes. Some of these low pressure areas are of such enormous extent that their frontal southerly winds extend to the west coasts of Great Britain and northward and westward toward Iceland and southern Greenland, while their northwesterly winds are strong over the Canadian Atlantic Provinces, and their westerly winds on the south extend well nigh to the Tropic of Cancer.

Among the cyclones that enter the northern ocean in winter are some that come from the Hudson Bay region across Labrador, or the archipelago to the northward, and thus, proceeding eastward or northeastward, strike against western Greenland. Others come up from the southward, either by way of Newfoundland or to the eastward of the island and enter Davis Strait. It is said that the region of high pressure over central and northern Greenland presents a barrier to the passage of cyclones over the permanent ice cap, hence the storms may at times escape northward through Davis Strait or eastward to northeastward across southern Greenland (60° to 65° N.), or to the southward of it into Denmark Strait or lower latitudes. Depressions also, though rarely, cross southern Greenland from Denmark Strait. An effect of the storms off the Greenland west coast is to help keep the ice moving in Davis Strait and, possibly as far north as Baffin Bay. A further result is the rather frequent foehn characteristic of the winds off the ice cap as the cyclone center moves close in on the coast. The warm foehn winds will receive later attention.

From the reports of the various expeditions, some idea may be had of the weather conditions announcing the approach and passing of a typical cyclone on the west coast. Prior to the fall in barometer, cirro-stratus clouds begin to cover the sky. As they thicken, the pressure begins to fall and the atmosphere becomes hazy, inducing that form of superior mirage known as looming or the raising to the vision of objects so distant that they are normally below the visible horizon. Relative humidity begins to fall and has been known to drop to 15 percent of saturation, at Ivigtut. Lenticular alto-stratus clouds begin to appear, and the wind strengthens, rising from the north and east on more northerly parts of the coast, then changing to southeasterly, but more likely to begin from southeast to south in lower coastal latitudes. As the storm center nears, the wind may become exceedingly high, in increasing gusts, which become stronger and more sustained, sometimes reaching 100 miles an hour or more near the cyclone center. As the LOW passes, the winds become lighter and more variable, the humidity rises, and precipitation usually follows, beginning as rain if the air is sufficiently warm, later changing to snow, depending upon the season of year, before clearing.

In some of these cyclones the pressure development is such as to draw masses of air as foehn winds down the slopes from the interior ice cap toward the depressed center or trough over Davis Strait. When this occurs, and the pressure gradient is strong, the air descent toward the coast takes on great speed, sometimes at the rate of 50 to 100 or more miles an hour, warming dynamically during its down-slope passage. Sometimes, if the upper cyclonic air at the ice cap is fairly warm, by the time it reaches the coast, even in the Arctic winter, it may attain a temperature of 40° F. to even 60° F. above zero. During the foehn of January 21–25, 1929, the temperature at Godthaab rose to a maximum of 61° F. while that at Jacobshavn registered 59° F. The foehns are dry winds and are not to be confused with the ordinary thaw winds of cyclones, which are damp. On the west coast of Greenland the usual foehn directions are from east to south-southeast. On the east coast they blow down from some westerly to northwesterly point, off the ice cap, with similar cyclone types in the Denmark Strait.

Southern Greenland projects into that part of the Atlantic traversed by the great cyclones which bring some equatorial air far northward, with oceanic as well as continental atmospheric whirls entering the polar area. Of the Atlantic storms the greater number enter high latitude waters, that is, north of

the 60th parallel, between Greenland and Norway. While the tracks of some pass northward, west of Iceland or over Iceland itself, there is a greater likelihood that they will go south of the islands and then on toward northern Europe or into the Greenland Sea.

In winter the storms are frequent and often severe, and during the Icelandic fishing season, which begins in February, heavy gales coming on are likely to cause some loss of life among the small vessels. In summer there is much less storm severity. At this season the depressions, though frequent, are for the most part shallow. Numerous cyclones of the Arctic originate in or come up from middle to low latitudes of the Atlantic, and it is not extraordinary for a winter storm, coming out of the southern part of the United States, to progress northeastward into the region of the Icelandic LOW.

In the northern Atlantic, while some storms maintain their identity across the ocean to Icelandic waters or the European coast, others are lost in the great low pressure areas that fluctuate for days at a time over the northern steamer routes and south of Iceland. The weather in high latitudes depends upon the winds, and, as the winds change with the movements of storms and vary but little during periods of quiescent barometer, the freedom of progression of the LOWS or their stagnation very positively affects the weather at all places subject to their influence. As the winds greatly influence the flow of the ocean currents, causing local fluctuations of the warm and the cold streams about the coasts, as of Iceland, so is the coastal weather affected by its surrounding water. And if the cold water carries ice masses inshore, there are heavy winters, backward springs, and raw and unproductive summers; thus human needs as well as navigation are affected.

Atmospheric circulation.—With the Icelandic LOW occupying a great part of the region under discussion, an ideal circulation, left-handed about a center of low pressure in northern latitudes, would cause a flow of prevailingly westerly surface winds along its southerly boundaries on the North Atlantic and a return flow of prevailingly easterly winds in the Arctic regions to the northward. For the northern Atlantic, the wind sweep is true to form. On the western side, in Newfoundland waters, during the colder season, when the Icelandic LOW is best developed, the direction has a small north of west movement, becoming more westerly in mid-ocean, more southwesterly toward the coast of Scotland, and turning more to southerly on the eastern side of the LOW. It must be remembered, however, that, owing to the frequent passage of cyclonic storms over all northern waters, the prevalent easterly wind drift is often masked locally by winds from other directions.

On the Arctic side of the semipermanent LOW much less is known of the winds, except that they appear in general to have a westerly drift, in conformity with the circulatory laws. The atmospheric drift, like that of the sea currents in high polar latitudes, is irregular, with the oceanic streams largely influenced by the more prevalent winds. Counting the calms, which in some locations are frequent, the easterlies remain by large percentages the prevailing winds. This is likewise true for the Icelandic stations, most especially for Grimsey, a small island off the north coast, where more than 50 percent of the winds are easterly. In addition, from the few ships' observations made for the Weather Bureau in the 5° ocean square 65° to 70° N., 20° to 25° W., north of western Iceland, during the period April–August 1887–1932, 65 percent of the observations were from northeast to south-southeast, with east the prevalent direction and northeast next in frequency. These figures indicate the normally to be expected turn of winds toward the southwest along the east Greenland coast between the anticyclone of the ice cap and the low-pressure region, weaker though still existent in summer, in lower Denmark Strait. The following table shows the percentages of wind frequencies:

TABLE 1.—*Percentages of wind observations, and mean velocity in knots, for the ocean area 65°–70° N., 20°–25° W., April–August 1887–1932*

	Mean velocity	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm
April	19.3	0	21	14	30	14	14	7	0	0
May	18.2	4	25	38	7	4	12	10	0	0
June	15.0	5	30	34	8	5	3	11	1	3
July	11.1	4	24	14	12	7	15	9	8	7
August	13.0	3	14	42	10	10	3	19	0	3
Means	15.3	2	23	28	14	8	9	11	2	3

As the higher latitude ocean drift tends to move right-handedly about the pole, that is, brokenly toward westerly, so does the surface atmosphere, with all its eddies and anticyclonic air masses, tend to follow a somewhat analogous course. Greenland alone among Arctic lands offers a longer and more real barrier to the general circulation. With the island's elevated and cold interior, covering much of its 800 miles extreme width, over which relatively high atmospheric pressure prevails, the surface air tends to pour outward, easterly as well as westerly, thus interrupting along more than 1,000 miles of its length the westward-moving arterial flow.

Wind velocities at sea.—In the northern Atlantic

region of the prevailing westerlies the average velocities are much higher than in the ocean areas to the north. Take, for example, the ocean area 55° to 60° N., 20° to 25° W., well south of western Iceland, where the mean annual velocity is 19 knots; the area 55° to 60° N., 00° to 05° W., with average velocity of 15 knots; and the area 60° to 65° N., 00° to 05° W., where the yearly mean is 16 knots. In all these areas the winter averages are double or more those of mid-summer, with frequent heavy gales.

For practically all the Atlantic north of the 60th parallel, very few or no ships' observations are available in our averaged records for the colder months and comparatively few for the warmer period. Thus, for the area 65° to 70° N., 20° to 25° W., the observations include April to August, with average velocity of 15 knots. In the area 60° to 65° N., 0° to 5° W., the average for the same months is 13 knots. The same is true of the area south of eastern Iceland, 60° to 65° N., 15° to 20° W. In the heart of the trans-Atlantic westerlies, 55° to 60° N., 20° to 25° W., the April to August mean is 15 knots, or in agreement with the average of the region north of western Iceland.

We may interpret from the foregoing that the average April to August sea winds are generally lighter over the Icelandic LOW region between 60° and 65° N. than in the 5° latitudinal strips north and south of it.

Among the westerlies the great majority of the heavier gales, force 10–12 Beaufort in winter and 8 to 10 in summer, are from the prevailing directions. The few summer gales in the region northwest of Iceland appear to be mostly from northeast to east, while south of Iceland the scanty record shows easterly and westerly gales without much discrimination.

The characteristic wind directions in Davis Strait and Baffin Bay are southeasterly up the Greenland side and northwesterly down the side of the Canadian Archipelago. Northwest are most prevalent in May and June and southeast in August and September. The principal gales are from the two directions, though northeast gales are also said to occur. The most frequent of all gales are from southeast and east-southeast. The least frequent are from southwest, since the more violent of the traveling depressions are confined to Davis Strait and do not go sufficiently far north as to carry their southern quadrant gales into these waters.

Air temperatures over the sea.—The eastern part of the Greenland area is, of course, the warmer, owing to the great northward sweep of the north Atlantic (Gulf Stream) drift, so that the general trend of the isotherms is northeasterly-southwesterly over a considerable part of the sea, particularly in the Icelandic area and the Greenland Sea.

In Icelandic waters on the north the January mean is about 28° F. and on the south, some 32° F. or slightly higher. This rises southward to about 42° F. at latitude 60° N. In July the air over the sea north of Iceland has a mean temperature of about 45° F., rising to about 50° F. immediately south and southwest of the island, and to 55° F. or higher in the same longitudes at latitude 60°. South Greenland waters in July have mean temperatures about like those south and west of Iceland, except that in the southern reaches of Davis Strait the averages are lower, approximately 40° F. to 44° F. In January, when the isotherm of freezing runs along off the south coast of Iceland, the isotherm of 20° F. skirts Cape Farewell after descending close off the southeast Greenland coast. At that season temperatures fall rapidly northward over Davis Strait and Baffin Bay until, over the Kane Basin, there has been at least a 50-degree fall to −30° F. or lower. Throughout this long and largely ice-packed sea strip between Greenland and the Canadian Archipelago, temperatures on the east are much higher than on the west, with the isotherms "falling almost perpendicularly" from the Greenland toward the Canadian shores. As examples, the air isotherm of −10° F., leaving Melville Bay in January at about 75° N., cuts south across the east entrance to Hudson Strait near 62° N., while the isotherm of 10° F., leaving west Greenland near 66° N., makes a chilly southward cut to Belle Isle, Newfoundland, at 52° N.

Fog.—Arctic fog, as off the Banks of Newfoundland, occurs where cold- and warm-water currents meet; it forms over the edges of open water adjoining a great body of ice; and on coasts where the temperatures of land and water are unequal. Over much of the North Atlantic Drift, while warm winds are blowing over the warm water, there is little cause for fog formation, and the same is true of the centers of most open seas, whether partly surrounded by land or ice pack.

Fog is low, very local, or high and extensive, depending upon the place and the occasion. Over rifts or patches of open water in the midst of ice, or over open fjords, when the air is very cold, off land or ice surface, filaments or billowy masses of fog arise. These, known variously as "water smoke," "Arctic ice smoke," and "smoke frost," are the result of the immediate condensation of the moisture evaporated from the water into the cold, dry air.

Such scattered fogs rarely gather into dense and persistent wide masses.

On coasts like those of Greenland, where chilly summer sea breezes result in boundary line fogs along the much warmer land strip, the condition is usually shallow, but at Jan Mayen and other islands, the fogs are likely to be of great depths above the surface, sometimes extending for 1,000 or more feet in elevation, especially if associated with atmospheric stagnation, in decaying cyclonic air masses.

Coastal fogs do not extend far inland as a rule, but the high and widespread fogs may sometimes cover a great extent of land and sea.

From Greenland across Iceland summer is the foggy season, changing to winter in the interior, or wherever continental-type conditions predominate.

Local fog conditions will be further considered under the geographical headings that follow.

While Scoresby reported seeing dry fogs over the Greenland Sea, at other times, with the temperature below freezing, fogs have been known so damp as to form icicles on a ship's rigging.

Mist, which is one of the greatest troubles to travelers on the Greenland Sea, greatly depends on localities, decreasing in proportion to the distance from the open sea, and being more common in the south than in the north. It generally sets in with northerly and westerly winds in summer, and does not penetrate far into the country or inlets.

Cloudiness.[1]—Early assumptions that the interior of Greenland is characterized by a dominance of clear weather, have not been borne out by recent expeditions. These recent investigations and records show the percent of cloudiness to be very high, with mean cloud amounts of nearly five-tenths to six-tenths. Almost all cloud forms known in the temperate zone have been observed above the ice cap, although forms of strong convection are rare. As a result of low water-vapor content, the clouds are usually not very dense.

The sea near southern Greenland is one of the cloudiest regions on Earth. So far north as Jan Mayen the mean yearly cloudiness is over eight-tenths. The cloudiness varies between six-tenths and nine-tenths, in the mean, between north Iceland and West Spitzbergen. But as the coast of Greenland is approached the likelihood of cloud decreases. The Greenland coasts, with a mean cloudiness of about six-tenths, are the least cloudy coasts of the Arctic Regions. There is no marked seasonal rhythm, apart from the occasional extension of ice-cap conditions with clearer skies in winters when the sea ice favors it.

Mirage.[1]—The mirage effect is especially remarkable in Arctic regions during light southerly winds. The effect is caused by the refraction of light experienced when passing through layers of air with different densities. In polar regions mirage, in which the light rays are bent downwards from a warm stratum of air resting on a colder, is seen most frequently. This type of mirage is known as "superior" mirage.

The distances involved are so great that details cannot be readily discernable without telescopic aid. As the stratification which produces this type of mirage is stable, the images are clear and well defined, and occasionally a second or third image can be seen. When the mirage effect is quite pronounced, objects may be seen from far greater distances than in the ordinary atmosphere. Under such circumstances, observations of heavenly bodies measured to the horizon are unreliable, and it is not unusual to have false suns and moons.

Aurora borealis.[1]—Auroral displays are very frequent, if not continuous near the magnetic pole. In summer they can seldom be seen because of the continual presence of the sun. The amount of light caused by them is about that of a quarter moon.

Auroras are believed to be phenomena caused by the passage of electrical discharges of some kind through the atmosphere. They are of a very varied appearance to the eye, and undergo rapid changes. Some of the forms in which they appear are as arcs, bands, rays or streaks, curtains or draperies, coronas, cloud shapes, or merely as diffused light.

Thunderstorms.[1]—Thunderstorms are very rare in the north. In the south, they might be expected, on the average, on 1 or 2 days a year. Thunderstorms occur, most frequently, late in August or early in September. The greatest number of thunderstorms occur on the southern tip of Greenland, where Nanortalik averaged 77 such storms over a period of 42 years.

Humidity.[1]—With air and snow temperatures about the same because of air being constantly in motion and with snow constantly evaporating, the relative humidity in this region is quite high, averaging 81.8 percent at Upernivik, and 85.0 percent at Godthaab. The highest average occurs in March or April and the lowest in December.

Visibility.—Beginning with the middle of June and extending through August, the visibility varies between very bad (prominent objects not visible at 200 meters) and indifferent (prominent objects not visible at 4,000 meters). A gradual improvement

[1] Prepared by the Bureau of Aeronautics, U. S. Navy.

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takes place during the fall so far as atmospheric conditions are concerned. The best visibility is in early spring when it varies between fair (prominent objects not visible at 10,000 meters) and very good (prominent objects not visible at 50,000 meters). As a forerunner of the so-called foehn storms, the atmosphere becomes extremely clear for a short period. At such times mirages frequently occur, and objects 100 to 200 or more miles distant loom up distinctly.

GREENLAND

The whole interior of Greenland is covered by a huge ice sheet, referred to as the ice cap. The ice cap has two centers of growth, both situated to the eastward of the center line of the country. One is situated about latitude 65° N., rising to an elevation over 8,000 feet, and the other in latitude 75° N., which rises to about 10,000 feet. From these domes, the surface slopes down at a gradient which is small in the interior and becomes steeper as its margin is approached.

Winds.—The cold air layer which rests over this ice cap flows downhill and is deflected to the right by the rotation of the earth. It is a typical katabatic wind, as it is caused by the gravitational flow of air. This katabatic wind is strengthened near the ice margin, with the occurrence of low-pressure conditions over Davis Strait, Baffin Bay, Denmark Strait, or the Greenland Sea, which forms a strong pressure gradient from the ice cap toward the coast.

Over the outer margins of the ice cap serious blizzards occur, at which times the katabatic winds may attain hurricane force at the ice edge. Even in the interior dense drifting snow accompanies high winter winds, wherein velocities of 40 miles per hour have been experienced.

The low coastal region of Greenland—the green as opposed to the white part of the island—is of varying but limited width. In general, it circumscribes the great anticyclonic surface whirl of winds which flows about white Greenland. The weather conditions of this narrow littoral, the "inhabited Greenland," are influenced greatly by the ice cap on the one hand and the sea on the other. On the north the few Danish stations are in the polar zone. On the south they are within the northern edge of the equatorial drift from the North Atlantic cyclones, the warmth from which, however, is much neutralized by the proximity of the interior ice sheet, as well as by the roving ice in Davis and Denmark Straits.

Owing to the broken nature of the coast, stations even in comparatively close proximity to each other are varyingly exposed to the meteorological elements. In the matter of temperature alone this may be illustrated by the differing degrees of warmth experienced in summer at Godthaab and Jakobshavn. While there is a general fall in temperature northward, July and August at Jakobshavn, in 69° N., are warmer by about 2° F. than those at Godthaab, in 64° N., the reason being that the northern station lies in a more sheltered position relative to the chill from the sea breezes. The winter temperatures at these two positions are in agreement with the latitudinal trend.

Wind conditions are likewise greatly modified by location. At a station in a fjord the tendency will be strong for the winds to blow along the length of the indentation as along a tunnel, though following as closely as possible the surface or component direction. Sometimes the wind above will be blowing at right angles to the fjord, while down in the fjord itself the air may be relatively still or calm. Gales blowing from landward over a high cliff ordinarily do not strike the lee lowland or the sea within 1 to 3 miles of the escarpment, and if they are purely local descending winds like the foehns, from the land slopes, they will blow themselves out some 10 to 15 miles to seaward. Other winds influenced by local conditions are the summer sea breezes and the autumn land breezes along the fjords. These winds are so prevalent and often so violent as to hamper navigation within their limited reach.

The characteristic dry foehn winds down the slopes and on the coast have previously been described in general. These winds are said to occur in Greenland regardless of latitude, but are probably most common on the west coast, to the southward of Melville Bay, beyond which the causative effects from cyclones or their secondaries in Davis Strait rarely penetrate. The great positive result of these descent-warmed winds in the cold season is the rapid and often great rise in temperature which subjects the coast to very high absolute maximum temperatures in the same months with the very low minimum temperatures to be expected in an Arctic winter. Since the foehns do not affect all parts of the coast equally or at the same time, "It is a perfect chance," says Petersen, "where the highest temperature is attained." It may even be higher at Upernivik than at Julianehaab. The extreme maximum temperatures during 40 years at Upernivik in January and February, for instance, were 55° F. and 60° F. while at Ivigtut in 48 years they were 56° F. and 58° F.

Since, because of land configuration, the local winds do not always conform to the general circula-

tion noticeable over the open sea, there are local types of winds everywhere along the Greenland coast. The all fit, however, into the variegated picture of the island's weather and climate, whether they relate to direction, to the calms of Ivigtut, or to the violent gales spoken of by Shackleton off Etah.

Notwithstanding the winter prevalence of the winds from southeasterly and the summer prevalence from northwesterly and southeasterly over the extreme eastern waters of Davis Strait, they are not well reflected in the local coastal directions. At Godthaab, close to the sea and more exposed to it, only 4 percent of the annual winds are southeasterly. Except in summer, when southwesterly directions are in the majority, the most frequent winds are northeasterly, closely followed for the year by north, east, and southwest directions. Calms are quite common except in winter, and it is only in winter that strong gales average to occur as often as once a month. The mean wind velocity is low, only 10 knots for the year, varying between 7 knots in July and 12 in February.

At the more sheltered station of Jakobshavn, while strong gales are about as frequent—some 8 a year—calms are nearly three times as often observed as at Godthaab, or in 30 percent of the annual observations. It is singular to find these most frequent, 41 percent, in March, at a period when Arctic windiness might be expected as high. Yet the mean wind velocity is only 5 knots, while the average for the year is only 6. The prevailing winds are east to south except in summer, at which period, though variable, they are most frequently north and west.

Most apparently anomalous of all are the wind conditions at Ivigtut. So far as wind movement is concerned, the most frequent direction is southeasterly, but more than 50 percent of the observations show calms, and when it comes to the average velocity, it is only 2 knots for the year, with little change from month to month. Furthermore, conditions are similar at Angmagssalik on the east coast, where calms are as frequent and prevalent directions are of little significance beyond the fact that south winds have the edge in summer and west to northerly winds in winter. Much of the sheltered fjord country may well be considered as quiet, except overhead and on the more open coasts accessible to the sweep of the freer winds and the gales.

Temperatures.—Among the climatic elements perhaps none may be more variable from year to year than that of temperature. Single month or single year records might show only the colder or the warmer side. Fortunately, some of the older Danish stations have long records, so that the term averages and the extreme averages form good bases for comparison.

TABLE 2.—*Average, extreme average, and absolute highest, and lowest temperatures at five Greenland Stations*

	January	February	March	April	May	June	July	August	September	October	November	December	Mean
Upernivik, 72°47′ N., 56°07′ W.													
Average	−7	−10	−7	7	25	35	41	41	33	25	15	2	17
Highest average	8	11	9	22	29	40	48	48	38	32	22	26	...
Lowest average	−18	−23	−19	−4	15	31	38	36	29	18	5	−13	...
Absolute highest	55	60	47	50	56	63	68	69	69	63	53	48	...
Absolute lowest	−39	−44	−41	−30	−8	10	19	24	13	0	−17	−35	...
Jakobshavn, 69°13′ N., 51°02′ W.													
Average	0	−3	3	15	31	40	46	44	35	25	17	9	22
Highest average	18	23	18	30	38	46	52	51	41	33	30	28	...
Lowest average	−15	−21	−13	3	23	36	43	41	31	15	10	−8	...
Absolute highest	*59	49	48	55	62	67	71	66	65	58	54	52	...
Absolute lowest	−45	−46	−42	−35	−10	21	28	24	8	−6	−18	−34	...
Godthaab, 64°11′ N., 51°43′ W.													
Average	14	14	19	25	33	40	44	43	38	31	24	18	29
Highest average	28	34	29	33	37	45	49	47	43	37	29	31	...
Lowest average	5	2	7	17	31	37	42	40	35	26	20	10	...
Absolute highest	*61	51	53	56	61	74	76	71	62	65	58	59	...
Absolute lowest	−20	−17	−19	−6	11	22	29	27	18	6	−1	−14	...
Ivigtut, 61°12′ N., 48°10′ W.													
Average	19	19	24	31	40	46	50	47	41	34	27	21	33
Highest average	30	39	34	42	45	52	53	51	46	41	28	36	...
Lowest average	12	7	11	24	36	43	47	44	39	29	21	11	...
Absolute highest	56	58	60	61	74	86	74	71	70	67	64	60	...
Absolute lowest	−18	−20	−17	−5	13	28	33	29	22	9	0	−16	...
Angmagssalik, 65°37′ N., 37°33′ W.													
Average	17	14	18	24	33	41	44	42	37	30	23	19	29
Highest average	28	24	23	30	38	45	47	46	41	37	29	29	...
Lowest average	5	2	9	17	29	38	42	40	34	22	16	7	...
Absolute highest	48	59	52	57	61	77	77	77	70	56	55	47	...
Absolute lowest	−23	−23	−26	−14	4	22	27	22	18	6	−13	−21	...

*The high maximum temperatures of 59° at Jacobshavn and of 61° at Godthaab were read in January 1929 during the occurrence of a strongly developed foehn wind of the 21st to 24th.

Along the west coast strip from Ivigtut, near 61° N., to Upernivik, near 73° N., there is an irregular fall of 16° F. in mean annual temperature, or from 33° to 17° F. The change is less marked in summer than in winter, for while in July the drop is only 9° F. or from a mean of 50° at Ivigtut to one of 41° F. at Upernivik, in January there is a fall of 26° F. from 19° F. in the south to −7° F. in the north. Near the 82d parallel where scattered observations have in some sort been combined for an approximate mean, the average annual temperature is not remote from zero. Here the coldest month, usually February in middle and northern Greenland, has an average temperature of about −35° F., while in July the mean is about 38° F. Thus, over the vast extent considered from southern to northern Green-

land the annual mean falls about 33° F., the midsummer mean about 12° F., and the midwinter mean about 54° F.

In summer the fall in temperature with latitude shows small irregularities, since Jakobshavn, although 5° farther north than Godthaab, has average July and August temperatures some 1° F. to 2° F. the higher, or on the order of 46° F. and 44° F. at the northern station against 44° F. and 43° F. at the southern.

If we consider the months having average temperatures above 32° F., taking the stations from north to south on the west coast and then up the west coast, we find none at North Star Bay, but at Upernivik and Jakobshavn June to September average above freezing. At Godthaab and Gornog the period is May to September; at Ivigtut and Nanortalik, May to October; at Angmagssalik, May to September; and at Danmarkshavn, June to August.

The mean daily minimum temperatures are above freezing at Upernivik during July and August; at Jakobshavn from June to August; at Godthaab from June to September; at Ivigtut, May to September; and at Angmagssalik, June to August.

The average temperatures are below zero F. at Upernivik from January to March, and at Jakobshavn in February.

The mean daily minimum temperatures are below zero at Upernivik from December to April, and at Jakobshavn from January to March.

It must always be realized, however, that the foregoing average facts may not be applicable in several individual months of specific years. A few extreme monthly averages will show that definitely. The greatest extremes have usually occurred in February. For example, at Upernivik, there is a range of 34° F. between the highest and lowest averages of the month, or from 11° F. to—23° F.; at Jakobshavn, with a range of 44° F., the extreme averages are 23° F. and —21° F.; at Godthaab, with a range of 32° F., the extremes are 34° F. and 2° F. The ranges are much less in the warmer months, but there has been a difference of as much as 12° F., or from 48° F. to 36° F., at Upernivik, in August. Every highly abnormal month tends strongly to change the term averages. Table 2 shows the mean temperature ranges at five stations and, to complete the comparison, includes the average and the absolute highest and lowest temperatures for the several months.

So far as can be determined for coastal Greenland the highest and the lowest temperatures are 86° F., recorded at Ivigtut in June, and —74° F., read on the north coast in about 82° north latitude. The absolute range is therefore about 160° F. In the extreme north temperatures up to 54° F. have been observed, and in the sheltered valleys of Peary Land, to the poleward of the ice cap which is limited by the 82d parallel, excellent grazing has been found for the herds of musk oxen, thus indicating some degree of moderation in climatic conditions.

Nordenskjold emphasizes the "prodigious rapidity of the temperature changes accompanying certain winds blowing from the interior." His allusion, of course, was to the result of foehn action, which, when frequent, is mainly responsible for the average as well as the individual high temperatures of exceptionally warm winter months. There is an instance at Scoresby Sound of a rise of 43° F. or from—4° F. to 39° F., in a single hour. At several stations in winter, with land winds, warm and beautiful weather has been known to persist for several days.

In summer, over the warm marginal land of the west coast, some of the most uncomfortable weather follows the sea breezes which, with their coolness off open water, impart likewise a rawness which is quite in contrast with the dry and agreeable winter foehns.

A glance at table 2 (p. 7) will show that at Ivigtut the lowest temperature in the record for July is 33°F. Many Julys as well as Augusts are free of frost from Jacobshavn southward, and all months from June to September have in varying years been without freezing temperatures at both Ivigtut and Godthaab. Even in winter there have been frostless days at Upernivik, though very rarely, in January and February, while at Ivigtut nearly half the days in November, December, and February, in extremely favorable years, are known to have been without frost.

Precipitation.—Greenland's precipitation, except in summer, falls mostly as snow. As long ago as 1877, Dr. Henry Rink summarized the seasonal frequencies of rain, snow, and mixed precipitation, including sleet, at Jakobshavn and Godthaab, as shown in Table 3. Although the days with some form of precipitation relating to that time do not agree with the longer record averages by seasons, yet they do show an interesting comparison between the types of fall and also the fact that, while snow sometimes falls in summer, even rain may occur in winter.

TABLE 3.—*Average number of days with precipitation*

(By types and seasons)

Jakobshavn				Godthaab			
	Rain	Snow	Mixed		Rain	Snow	Mixed
Winter	0.5	18.8	0.2	Winter	0.4	38.2	4.6
Spring	1.5	20.0	1.8	Spring	4.8	28.0	3.0
Summer	23.2	3.7	4.0	Summer	26.5	1.4	2.0
Autumn	6.0	15.7	3.8	Autumn	10.0	15.8	8.0
Annual	31.2	58.2	9.8	Annual	41.7	83.4	17.6

The amount of precipitation is greatest over extreme southern Greenland, that part of the island most closely coming under the influence of the moist air masses from the Atlantic. Precipitation decreases northward. Thus, while the average annual fall at Ivigtut is about 45 inches (rain and melted snow), it falls to 23½ inches at Godthaab and to 9 inches at Jakobshavn and Upernivik. On the east coast, at nearly the same latitude as Godthaab, the amount is 34½ inches.

On the west coast the period of greatest average fall is in late summer and autumn, and nearly one-half of the year's amount is measured from August through November. The driest months are scattered through winter and early summer. At Jakobshavn and Upernivik falls are very light in January and February. At Ivigtut, in the zone of most fall, the wettest month is September, with an average of 6 inches, but the heaviest 24-hour fall, also 6 inches, occurred in January.

On the east coast, at Angmagssalik, the wettest season is from October to April and the driest from June to August. Here the wettest month is October, with about 6 inches fall, but the greatest 24-hour amount, 5 inches, occurred in May.

Precipitation days are most, 158, at Angamgssalik, occurring on 15 or 16 days monthly from October to April, and on 10 or 11 days during June to August. On the west coast the annual "wet" days range between 142 at Godthaab and 84 at Upernivik, with falls on an average of 7 to 11 or 12 days monthly from Ivigtut to Jakobshavn, and on 4 to 11 days at Upernivik.

In southern Greenland the difference between the quantities of snow falling in different years is astonishing. Sometimes it is poured down at intervals during the course of the whole winter; sometimes the greater part of it falls during a couple of weeks in March and April alone. And in Julianehaab, not a single drop of rain had fallen from September 27, 1862, until May 20, 1863, but there was snow from 8 to 20 feet deep. Some summers are exceedingly dry, while in others, periods of rainy weather set in with 2 days out of 3 days being rainy days.

Cyclonic depressions play their part in causing precipitation. While with some, as previously noted, they serve to draw the warm, dry foehn winds down from the ice cap, others, striking at a different angle on the coast, bring moisture with southerly to southwesterly winds—winds that blow against the slopes, thus causing condensation as rain or snow, or of rain on their warmer sides, turning to snow on their colder sides.

Cloudiness.—Cloudiness varies, and not wholly with latitude, on the west coast. At Ivigtut, for instance, there is about six-tenths obscuration the year round, with a very slight increase in summer. At nearby Arantfjord there is much low stratus cloud from December to March, during which time the sun is seldom seen along the horizon. At Godthaab there is seven-tenths cloudiness on an average throughout the year, but heaviest by a small margin in January. At Jakobshavn there is a decrease to four-tenths or five-tenths, with the most in autumn and the least in late winter. At Upernivik the most variation is found, with some seven-tenths in late summer and autumn, and four-tenths to five-tenths from January to March. At Camp Scott, in the uplands of the Upernivik District, during the Fourth University of Michigan Greenland Expedition of September 1930–April 1931, the cloudiness was a little less than six-tenths, with nearly all types of clouds observed, but with the lower forms most frequent. On the east coast, Angmagssalik has six-tenths to seven-tenths, with fullest cover in late fall and winter.

Relative humidity.—Relative humidity is rather high, averaging some 85 percent on the southern coasts and about 70 to 80 percent farther up the west coast to Upernivik. With differing exposures, the times of mean highest and lowest humidities are associated with either summer or winter. At Angmagssalik the average is about 80 percent. The periods of lowest humidities are those in which the foehn winds occur.

Fog.—While coastal Greenland has previously been referred to as climatically fickle, it may again be emphasized, relative to fog. With other sharp weather changes, from day to day, or from year to year in a given month, bright sunshine with its inevitable mosquitoes may suddenly change to dense fog. In summer particularly, while the border of coastal land is warm, the faintest to the strongest breeze from off the cool unfrozen sea will create a quick condensation, and blanket with gray dampness

all parts of the coast exposed to it. Closely adjoining places of unlike exposure will thus have fog on the one hand and clear weather on the other. Because of this fact, stations like Nanortalik and Godthaab have much more fog than other stations or localities, like Ivigtut, which are protected from the direct sea influence

Thus, at Godthaab, there is an average of 61 days in the year, while at Ivigtut the number falls to 26. At both places during winter fog averages to occur on a day or less a month. It begins a slow increase in spring, finally attaining its peak of frequency in July and August. Ivigtut has 4 to 7 days monthly from June to August, while Godthaab has 7 days each in May and September and 10 to 13 days in June to August. At Nanortalik July has a maximum of 15 foggy days followed by 13 in August, thence scaling off rapidly toward the winter months of low production. At Jakobshavn and Godhavn fog reaches its highest frequency, on an average of 113 and 127 days a year, which includes much more autumn to spring fog than is recorded elsewhere, with the partial exception of Scoresby Sound, on the Greenland coastal strip, as may be seen in Table 4.

TABLE 4.—*Average number of days with fog at Greenland coastal stations*

Stations	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Upernivik	2	2	2	4	5	9	11	7	2	1	1	2	47
Jakobshavn	9	7	9	11	12	12	11	11	9	9	9	9	113
Godhavn	9	9	11	12	15	15	17	17	8	4	3	5	127
Holsteinsborg	1	1	1	3	4	7	7	7	3	1	1	1	37
Gornog	1	.3	.4	1	2	2	4	4	2	1	1	.3	17
Godthaab	1	1	1	3	7	10	13	13	7	2	1	1	16
Ivigtut	.2	.2	.4	1	2	4	6	7	3	1	1	.2	26
Julianehaab	1	1	2	4	8	11	15	14	9	5	3	1	71
Nanortalik	.3	1	1	2	7	10	15	13	7	3	1	.4	60
Angmagssalik	1	1	1	3	7	9	9	8	4	3	2	.4	48
Scoresby Sound	3	7	5	9	13	16	10	10	10	4	3	8	98
Myggbukta	0	1	1	1	2	6	6	7	4	0	---	-----	28

Storms.[2]—Some general characteristics associated with Greenland storms are:

They are more frequent in winter than summer.

They are associated with the movement of a cyclone up or toward the coast.

The first warning, before any appreciable drop in pressure, is the increasing cloudiness, the sky becoming overcast with cirro-stratus clouds.

As they thicken the pressure begins to drop and the atmosphere becomes hazy. Under such conditions objects normally invisible, being below the horizon, because of a superior mirage, now loom above it. A few hours after the cirro-stratus clouds thicken, the lenticular alto-stratus clouds form and a more rapid decrease in relative humidity follows, a minimum of 15 percent having been recorded in the first part of a storm. With the steepened barometric gradient, the wind begins to blow. As the wind is down slope from off the ice cap, it has been heated adiabatically at the dry rate on its descent and brings about very rapid and very notable changes in temperature. At the beginning and the end of the storm the wind is very gusty. As the storm develops the gusts become more intense and close together until in the middle of the storm the wind has a fairly uniform but high velocity, often over 100 miles per hour. As the low-pressure areas passes on there is a period of unsettled weather with shifting winds of reduced velocity, increased humidity, condensation in the lower part of the atmosphere, and usually precipitation. The clouds at this time are strato-nimbus and nimbus changing to cumulo-nimbus then to strato-cumulus and fracto-cumulus and in turn a clearing sky with a few cirri. In general, as the sky becomes clear, the temperature continues to drop slowly with little or no wind.

Movement of storm areas.[2]—A comparison of the temperature-pressure records from January to July 1933, from Nanortalik, Ivigtut, Jakobshavn, Upernivik, Peary Lodge, and Thule on the west coast and Angmagssalik and Scoresby Sound on the east coast, indicates that a high precentage of storms are first observed at Nanortalik in South Greenland and travel up the coast on both sides of Greenland, low pressure occurring first in South Greenland and later farther north, usually on both coasts. Of over 30 cyclones thus located only one may have crossed the ice cap and that one in the southernmost part of Greenland. It indicates that practically all the lows move up along either the west or the east coast; often there are separate disturbances moving up each coast simultaneously. The explanation of this movement of the cyclones lies in the existence of an anti-cyclone over the inland ice. This anticyclonic condition is the mechanism that acts as the "switch," preventing a disturbance from crossing from one coast to the other.

Icing conditions.[3]—It has been found that icing is most intense in regions where convectively unstable air is being lifted, such as at fronts and in the vicinity of mountain ranges. Also it has been found

[2] From meteorological studies of the University of Michigan-Pan American Airways Greenland Expedition, in 1932-33.

[3] Prepared by the Bureau of Aeronautics, U. S. Navy.

hat the drop size and amount of water present in he atmosphere as well as the temperature of the ir are important in determining the amount of ice ccretion that may be expected.

Clear ice or glaze, which is the greatest hazard to lying, will be formed when the temperature is near 2° F. and when the drop size of the water which emains unfrozen on impact is large and, as a result, vill spread over the remaining surface of contact, progressively freezing and resulting in the formation f a sheet of clear, transparent, glassy ice.

Rime ice accretion occurs when the temperature s colder and the water droplets are small. In this ase the entire drop freezes immediately when it trikes the aircraft, resulting in a deposit of numerous ellets separated by air bubbles. Actual experience nd records show that the worst icing conditions ccur with temperatures only slightly below 32° F., nd ice forms most frequently with temperatures rom 32° F. to 14° F. The frequency falls off rapidly vith colder temperatures and practically ceases at ° F.

Very little data is available on actual icing condiions in Greenland, and temperature is about the nly factor we have to indicate these icing conditions. t may be inferred from studying the air temperaures of this region that icing conditions may be exected in the clouds, and whenever precipitation is ccurring. A reasonable estimate would be that cing conditions may be expected from 50 to 60 perent of the time, and extending from the surface to t least 15,000 feet. A further study of the temperaures indicates that icing conditions occur much more requently in winter than in summer, and occur nore frequently in the southern part of the west oast than further northward. In the north the emperatures are so low that severe icing should not e expected nearly so often.

In the case of seaplanes, accretions of frozen spray an be very severe. The temperature records for he Greenland Sea indicate that the surface water s about 36° F. at the same time that the air above s about 20° F. Under such conditions the accretion f frozen spray will build up very rapidly.

Ice.[4]—The following table contains the approxiate dates of arrival and departure of sea ice from reenland ports, subject to variations, and indicates he consequent period in which these places are pen to navigation.

[4] From H. O. Publication No. 74R.

TABLE 5.—*Approximate dates of arrival and departure of sea ice from Greenland ports*

Place	Approximate location				Pack ice	
	Lat. N.		Long. W.		Arrives	Leaves
	°	′	°	′		
Thule	76	32	68	45	Mid-October	Mid-June.
Upernivik	72	47	56	10	Mid-December	First of June.
Umanak	70	41	52	06	do	Mid-June.
Jakobshavn	69	14	51	07	do	First of May.
Godhavn	69	15	53	33	First of January	Mid-April.
Egedesminde	68	41	53	00	do	Do.
Holsteinsborg	66	55	53	42	Mid-January	First of April.
Sukkertoppen	65	24	52	54	Usually free	
Godthaab	64	10	51	45	do	
Faeringehavn	63	42	51	32	do	
Fiskenaesset	63	05	50	43	Mid-April	First of June.
Frederikshaab	62	00	49	44	First of April	Mid-June.
Arsuk-Ivigtut	61	10	48	30	do	Do.
Julianehaab	60	43	46	02	do	First of August.
Cape Farewell	59	45	43	54	Last of December	Do.
Angmagssalik	65	36	37	35	Mid-October	Mid-July.
Scoresby Sound	70	28	22	00	Seldom free	

Flying conditions[5]**—East coast of Greenland.**—Owing to the large amount of ice always present in the waters of the east coast of Greenland, and the rapid movement of this ice due to change of wind or tide, the fjords can be regarded as entirely unsuitable for permanent, or even temporary, bases for aircraft. The weather during the summer is almost always fine, warm, and very clear, with practically no wind, and flying conditions are generally excellent. Fog, for which the coast has a bad reputation, is scarcely ever encountered except for a period of about 10 days when the ice is breaking up in the spring. Otherwise, though low fog is often present over the pack to seaward, it hardly ever reaches the coast.

In the winter, conditions are not so suitable, owing to the large number of foehn gales, many of which reach force 12. Again, the fjords are unsuitable for aircraft bases, for if the freeze-up takes place when they are full of pack-ice the surface will be too rough for flying all the winter. Apart from the gales, and in spite of the short days, the winter flying conditions are good. There is little snow, practically no fog, and the temperature on the coast seldom falls below zero. There is almost always some fjord smooth enough to land on in case of a forced landing, and if a forced landing did have to be made it would be possible to walk to some inhabited place if the necessary emergency rations and camping gear were carried. But though in this way the winter conditions are better than the summer, the presence of foehn gales means that long-distance flights to or from any one base on the coast are out of the question. Even if an aircraft were large and powerful enough to fly

[5] From the report of the British Arctic Air-Route Expedition, 1930-31.

during one, drift-snow reduces the visibility to a few yards.

ICELAND

Climate.—Iceland, properly speaking, is not a polar land, since on the extreme north it barely touches the Arctic Circle and, moreover, it lies largely within the region of the warm North Atlantic Drift, which imparts to it a climate much more temperate than that at the average of its latitude.

While the island may be said to have an oceanic climate, yet it has some definite continental aspects, due in part to the considerable extent of the interior plateau with its valleys, its mountain chains, and its volcanic spurs and peaks, the highest of which rises 6,950 feet into the air. A part of the interior is covered with glaciers, some of which only occasionally melt away, and then violently, into debris-strewn "glacier torrents," which inundate great stretches of lower country during or following volcanic eruptions.

The climate of northern Iceland is sometimes called continental because of the enormous masses of ice which from midwinter to midsummer appear off its northwestern shores. Sometimes the whole north coast is blockaded with ice fields of such great extent as to give its weather a continental touch. If, then, there is a retreating movement alternating with a pressing in of the ice, the weather changes between cold continental and raw and chilly oceanic, depending on whether the winds blow wholly off the ice or partly off a cold water surface. From September to December there is little likelihood of ice in these waters. Midsummer is fairly free. When during May or June it is snowing in the mountains it is a sign that the dreaded drift ice is about to blockade the coast of North Iceland. If polar ice comes near the northern coast in summer, it may cause frosts, or even snows on the adjacent land that are sometimes so heavy as to wholly interrupt grazing and haymaking.

The weather and climate of Iceland are thus seen to be connected closely with the movements of the cold south-bound ocean currents and their ice. These currents also flow for some distance down the east coast, but the southeast, the south, and most of the west coasts are mostly bathed by the warm drift, and ice rarely appears there. On the east the two currents fluctuate, so that one or the other may at times or seasons dominate the onshore weather along a considerable stretch of coast. Only occasional years see the entire coast ice-free.

Over the more inhabited parts of the island there are two fairly distinct zones of climate, the north and south. Separated as they are by the rugged and chaotic interior divide, the weather is usually dissimilar even on the same day. Southerly winds, for example, may bring rain or snow, depending on the season, in South Iceland, but in passing over the highlands will lose their moisture and descend over North Iceland as dry, warm winds. In like manner, when cold, precipitation-laden northerly winds give stormy weather in the northland, the weather may be fair over the southern slopes and plains. Again, southwesterly winds may blow over the mountains and, in descending, raise the temperature on the northeast coast. Quite similarly, a storm, may be blowing on the southern coast, while only light winds to calm weather are occurring on the north.

In all the downslope winds we see exemplified the typical foehn winds which rise up one side of a divide and flow down the other, heated dynamically in the descent and often becoming "snow eaters" as they are known east of the Rockies. This foehn differs from the Greenland variety, which does not cross the highlands but descends on both sides of them from its overlying anticyclonic mass of air.

With the changeable and quite unreliable character of Icelandic weather, the various elements, as in Greenland, finally gather themselves, in the course of many years, into a strangely interesting climate.

Iceland occupies, with reference to the Icelandic LOW, a collarlike position between the principal mean center on the southwest of the island in Denmark Strait and the secondary to the northeastward over the Greenland Sea. Its principal free winds, therefore, will show cyclonic as also anticylonic characteristics, even with their considerable variability, due to the constant fluctuations of the LOW, the movements of the traveling cyclones from the Atlantic, and of the anticylones, either encroaching from the north or entering the region from the west or south.

Winds.—As in Greenland, however, the numerous fjords indenting the west, north, and east sides of the island contribute their quota of gorge and channel winds which blow in or out of them in purely local directions, often as mountain squalls of great force. A feature of the intensity of the mountain squalls down the fjords is the character of the clouds on the overlooking summits. If the clouds are light and move freely, the squalls will be moderate. If the clouds are dense and cling along the mountain tops and sides, the squalls will be violent. These heavier squalls may blow out along the length of the fjord, quickly losing their strength in open sea. Sometimes, with heavy winds outside the fjords and mountain

squalls at the land end, there will be calms or light winds between. In general, therefore, the fjord winds are treacherous. (See Wind in Icelandic Fjords pp. 16 to 22.)

For most of Iceland, easterly winds are somewhat the most prevalent, with east winds slightly in the excess except on the east coast, where, at Teigarhorn, the most frequent direction is north, and at Papey, northeast. Table 6 shows the percentages of annual winds for practically commensurate periods at four representative stations, Vestmannaeyjar, an island off the southwest coast; Stykkisholmur, on the west; Grimsey, an island off the north coast; and Papey an island on the southeast. The record for Teigarhorn on the east coast is for only 9 years.

TABLE 6.—*Percentages of annual winds at Iceland stations*

Station	Period of record	Directions								Calm
		N	NE	E	SE	S	SW	W	NW	
Vestmannaeyjar	1877–1906	12	3	22	10	8	11	8	4	22
Stykkisholmur	1873–1906	6	15	22	14	11	10	7	3	10
Grimsey	1873–1906	7	17	22	16	5	5	11	7	12
Papey	1873–1906	10	20	8	5	8	15	5	17	12
Teigarhorn	----------	24	16	16	3	8	5	6	3	31

A prominent characteristic of the calms is their greater frequency at all stations in summer than in winter. There is little change from one season to another in several of the direction percentages, but at Vestmannaeyjar north winds are much the least frequent in June and July, and at Papey both north and northwest are infrequent in summer. The directions for any single week or month are governed greatly by the local pressure situations over the surrounding sea, and thus may differ widely from the average direction of a long period of years. In February 1885 it is related that the Icelandic LOW was centered for many days between the Faroe Islands and Scotland, or at hundreds of miles southeast of its normal position, in consequence of which the winds came almost wholly from northwest to northeast. The barometric gradients were steep, and prolonged gales were the result.

The mean annual strength of the coastal winds is from 13 to 18 knots. The velocities are highest in winter, during the preiod of highest development of cyclonic storms. Counting the mean annual numbers of days with gales that reach force 9 or over on the Beaufort Scale, Vestmannaeyjar has 34, of which 5 occur monthly from December to February and less than 1 monthly from June to August. At exposed Grimsey there is an average of 12 days with strong to hurricane force gales, of which 2 monthly blow from November to February. Since these figures do not include the fresh gales—of force 8—the number of stormy days would be considerably increased by their addition. At Stykkisholmur, there was an average of 50 days annually with storm winds for the 34-year period 1873–1906, of which 17 were recorded in winter and 5 in summer. The extreme high-wind expectancy may be much higher in exceptionally stormy months. Some 60 percent of the storm winds on the west coast are from the northeast, and 50 percent on the east coast are from the northwest.

Temperatures.—The temperatures experienced in Iceland show in general an oceanic character at all except the highly broken interior, interspersed with valleys and ice-covered mountains or Jökulls. In all coastal districts, except during total ice blockades on the north, the proximity of the sea moderates the winter weather, while the foehn winds earlier mentioned add their influence by causing occasional and, for the season, abnormally high temperatures. In summer the comparatively cool oceanic-type winds similarly prevent the occurrences of any great degree of heat at that season, so that temperatures as high as 80° F. are almost, if not quite, unknown on the coast. In fact, the recorded high is 79.3° F. at Berufjordur in July, followed by 79.2° F. at Grimsey in August. There is also a reading of 79° F. at Teigarhorn in July. In the protected interior the temperatures may sometimes rise into the lower or middle eighties, while similarly, in winter, they fall more frequently to levels below zero than along the littoral.

The average range in mean temperature between the coldest and the warmest months varies with location and may be illustrated by three types of stations—the small island, Papey, off the east coast, Reykjavik on the southwest coast, and by Mödrudalur, one of the very few interior stations. At Papey the range is only 16° F., or between the cool August average of 45° F. and the moderate March average of 29° F. At Reykjavik the range rises to 22° F. or between the warm July average of 52° F. and the moderate December average of 30° F. At Möorudalur the cold continental aspect of winter is well marked, as is that of summer, with occasional high day temperatures averaging in with comparatively low night temperatures. Here the range mounts to 32° F., or between 50° F. in July and 18° F. in January.

The average warmest months are July and August, at most stations July. The coldest months lie between December and March, at the fewest of 17

stations considered, in December, and at about half of the stations in March. For the northern half of Iceland collectively, March, with a mean of 24° F., is the coldest month. For the southern half, January, with a mean of 30° F.. is colder by a few tenths of a degree than December, February, and March.

The coldest coastal section is the northeast, which may be represented by Grimsey, with an annual mean of 35° F. and with monthly means ranging between 26° F. in March and 45° F. in July. The warmest section is the Vestmannaeyjar with an annual mean of 41° F., and with monthly means ranging between 34° F. in December and February and 51° F. in July. At Grimsey the mean temperature is below freezing, by months, from December to April, and at Reykjavik from December to March, with 30° F. for each of the winter months.

Below zero temperatures, −5° F. to −6° F., have been recorded at Vestmannaeyjar in January and March. At Stykkisholmur they have occurred from December to April, with a minimum of −21° F. in January. At Grimsey, during the same 5 months the extreme low, −23° F., occurred in January. Table 7 (below) shows the absolute monthly extreme temperatures at three representative coastal and island stations; also the average temperature and the highest and lowest monthly averages, irrespective of years. March is seen to be a month of especially great temperature eccentricities.

TABLE 7.—*Average, extreme average, and absolute highest and lowest temperatures at 3 Iceland stations*

	January	February	March	April	May	June	July	August	September	October	November	December	Mean	Number of years
Stykkisholmur, 65°05′ N., 22°46′ W.														
Average	29	28	28	33	40	47	50	49	45	39	33	29	38	47
Highest average	34	34	37	41	45	50	54	54	50	44	38	35	---	34
Lowest average	17	15	8	25	35	42	47	44	42	33	28	18	---	34
Absolute highest	49	49	53	57	68	68	73	72	64	59	53	52	---	59
Absolute lowest	−21	−9	−13	−6	17	28	33	30	24	15	0	−6	---	59
Vestmannaeyjar, 63°24′ N., 20°17′ W.														
Average	35	34	35	39	44	48	51	50	47	42	37	34	41	43
Highest average	38	39	42	44	48	51	55	54	50	45	42	38	---	30
Lowest average	29	28	27	36	39	45	48	48	43	37	33	26	---	30
Absolute highest	50	51	51	55	65	70	72	69	62	56	52	51	---	55
Absolute lowest	−5	5	−6	4	15	31	37	31	27	17	3	0	---	55
Grimsey, 66°33′ N., 18°01′ W.														
Average	28	27	26	30	35	42	45	44	42	37	32	30	35	47
Highest average	35	34	35	38	41	47	50	51	47	40	37	36	---	34
Lowest average	8	13	2	19	31	35	39	36	39	31	25	16	---	34
Absolute highest	49	50	49	56	64	70	75	79	65	58	53	50	---	59
Absolute lowest	−23	−5	−11	−5	10	20	27	27	12	12	5	−5	---	59

Precipitation.—Precipitation in Iceland is closely related to the sea winds; that is, on the north coast it falls mostly with north and east winds; on the east coast with easterly and southerly winds; and on the south and west coasts with southerly and southwesterly winds. On the opposite coasts, these winds, if they cross the Jökull Divide, become dry, and in frequent instances descend as warm foehns. It sometimes happens of sea winds, especially if on reaching the coast they do not immediately encounter uplands, that they do not bring rain or snow until they strike the slopes. Condensation then begins, the clouds thicken, and precipitation occurs, increasing toward the summits. Rain may fall with southerly winds on the south coast in winter, and snow may fall with northerly winds on the north coast in summer, provided the ice drift brings the necessary chill

South Iceland receives the greatest amount of precipitation. The heaviest local fall, an average of 74 inches annually, is at Fagurholsmyri, where the January mean is 8.4 inches and the July and August means are each 4.3 inches. The amounts decrease northward, falling to only about 11 inches at Grimsey. Between these extremes may be found annual falls of 53 inches at Vestmannaeyjar, representing the southwest; 46 inches at Berufjordur, representing the southeast; and 26 inches at Stykkisholmur, representing the west coast. About most of the island the wet season extends through autumn and winter, but on the north, as at Grimsey, the wetter period is that of summer and autumn.

Precipitation may be exceedingly irregular, and one example of this condition may suffice to show how normal trend values may little compare with the individual values of any single month. At Stykkisholmur February has a 34-year average fall of 2.6 inches, but the monthly extremes for the period 1873–1906 were 8.6 and 0.24 inches. The possibilities of protracted wet spells and droughts in any season are well indicated by these figures for a winter month.

The average number of days with precipitation at stations varies with the differing periods from which published records are taken, but in general a mean of approximately 200 days is applicable to Vestmannaeyjar and Stykkisholmur, 117 at Grimsey, and 135 at Papey. Since at Vestmannaeyjar the annual fall is about double that at Skykkisholmur, it may be seen that the amounts per precipitation day are heavier at the more southerly station. The same in greater degree may be said of Teigarhorn, on the east coast, where 46 inches of fall occur on 145 days. On

this part of the coast some 4 to 5 inches of rain have been measured for 24-hour periods from June to August.

A comparison between the snowy and the rainy days indicates that on the north coast snow is the more frequent, falling on some 64 out of 117 precipitation days. On the west coast Skykkisholmur has 84 snowy days as against about 116 with rain, while at Vestmannaeyjar snow falls on 44 days, as compared with about 156 with rain. At Papey, close to the boundary of the cold and warm currents off the east coast, about 90 days have rain and 45 days have snow.

South Iceland has little summer snow, while North Iceland, during ice years off the coast, may have heavy and prolonged snows. In winter the South Iceland lowlands may have no snow for months on a stretch, the only precipitation being rain or sleet, which falls as snow on the highlands. On the north coast the winters may be very snowy, and the ground for a long time snow covered. Even at Reykjavik long periods with snow on the ground have been known, as occurred during the 63 days from January 19 to March 21, 1891.

At this time, as in other snowy winter periods at Reykjavik, there was little or no snow on the neighboring heights of Akrafjall. These facts indicate that with winter snows on the southern lowland, there is little on the elevations, and vice versa.

Dry, pelletlike snow, known as "hail," is fairly frequent in winter, averaging to fall about 24 times annually at Grimsey and 20 times at Vestmannaeyjar, but on only about 2 times at Papey.

Fog.—Among its important weather elements, Iceland is known for its fog, but while some of the coastal area is little visited by it, other parts may well be characterized as genuinely foggy. On the north coast, although it comes in rawly with northerly winds off the cold water, it is extremely irregular in occurrence and sometimes, while one side of a cape is enveloped with fog, the other side is clear. It is most common during ice years of the warmer season. At Grimsey fog is comparatively infrequent, averaging to occur on 33 to 46 days annually, according to the varying figures contained in two published records of much the same length, but doubtless of different years. It is infrequent in winter, but from May to August occurs altogether on from 24 to 31 days.

Fog is much rarer on the west, as at Stykkisholmur, where there are only 8 or 9 days with it annually, 2 of which are recorded in May. It is very rare on this coast except with west winds, when unusual masses of ice collect in Denmark Strait. Toward the southwest coast fog increases, and at Vestmannaeyjar averages to form on 52 days annually, with one-third of them in June and July. Here, as on the north and south coasts, fogs are most usual with winds from seaward.

The east coast is Iceland's really foggy section, especially on the middle and southeast. Beginning at Teigarhorn, with 65 foggy days annually, 30 of which fall in June to August, one goes south-southwest to Berufjordur on the coast and to the neighboring little island of Papey, and there, where the warm and cold ocean currents sway for the mastery, fog becomes of high significance. Here it is of equal or greater frequency in winter than elsewhere in summer, while during May to September fog averages to occur at Berufjordur on 16 to 21 days monthly and on 171 days in the year. In this vicinity fogs may appear with winds from all directions, but oftenest with those from westerly, in which case the bank may extend eastward from the very foot of the mountains. When it forms with easterly winds there is often an open belt alongshore, while the fog continues dense over the water outside it.

Table 8 gives the number of foggy days at key stations.

TABLE 8.—*Average number of days with fog at coastal points of Iceland*

	Years of record	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Stykkisholmur	35	0.2	0.5	0.5	0.7	2	1	1	1	0.7	0.3	0.3	0.2	8
Vestmannaeyjar	35	2	2	2	3	5	8	10	6	5	4	3	2	52
Berufjordur	35	11	11	11	14	17	19	21	18	16	12	11	10	171
Papey	34	9	9	10	12	13	16	17	16	12	11	10	8	143
Teigarhorn	35	2	2	2	4	8	10	12	10	7	4	2	2	65
Grimsey	35	0.3	0.3	2	2	5	5	7	7	3	0.9	0.2	0.4	33

While coastal fogs may give some indication as to far-surrounding sea fogs, the relationship cannot be taken too literally. Averaged vessel reports in these northern waters, too few in number to present definite climatic fog outlines, show low percentages of fog occurrence. We know moreover that over the warm waters of the North Atlantic Drift, fog is less likely to form than over the colder currents. Along the boundary lines of currents of strongly differing temperatures, fog may well be expected, particularly when warm, damp winds blow from the warmer current over the colder. Where these currents may conflict or mingle with each other, as east of Iceland, fog patches to masses may well be looked for. North of western Iceland, where fog is much associated with the prevalence and character of the ice drift, ships' observations show fog in some 10 percent of

their totals during June to August. This indicated frequency is much higher than for any parts of the adjoining coast for which there are actual records.

Cloudiness.—Clear skies are rare in Iceland, where an average of eight-tenths to nine-tenths cloud cover is so generally prevalent.

Icing conditions.—In winter, icing conditions are bad, with the strong possibility of ice formation in precipitation, in many cases from the surface up. In summer, conditions of severe icing seldom occur near the surface in the south where the average height of the freezing level is probably 5,000 to 7,000 feet in midsummer, but falls to about 2,000 feet with cold, northeasterly winds. In the north, the freezing level is usually 4,000 to 5,000 feet but icing occurs occasionally at the surface in midsummer.

WIND IN ICELANDIC FJORDS [6]

Weather conditions in the fjords of Iceland frequently bear little or no relation to those found in the offing.

As no two fjords are alike in shape, size orientation, or bordering relief, local peculiarities of wind and weather are so numerous that it is impossible to do more than indicate the main factors which must be taken into account when forecasting.

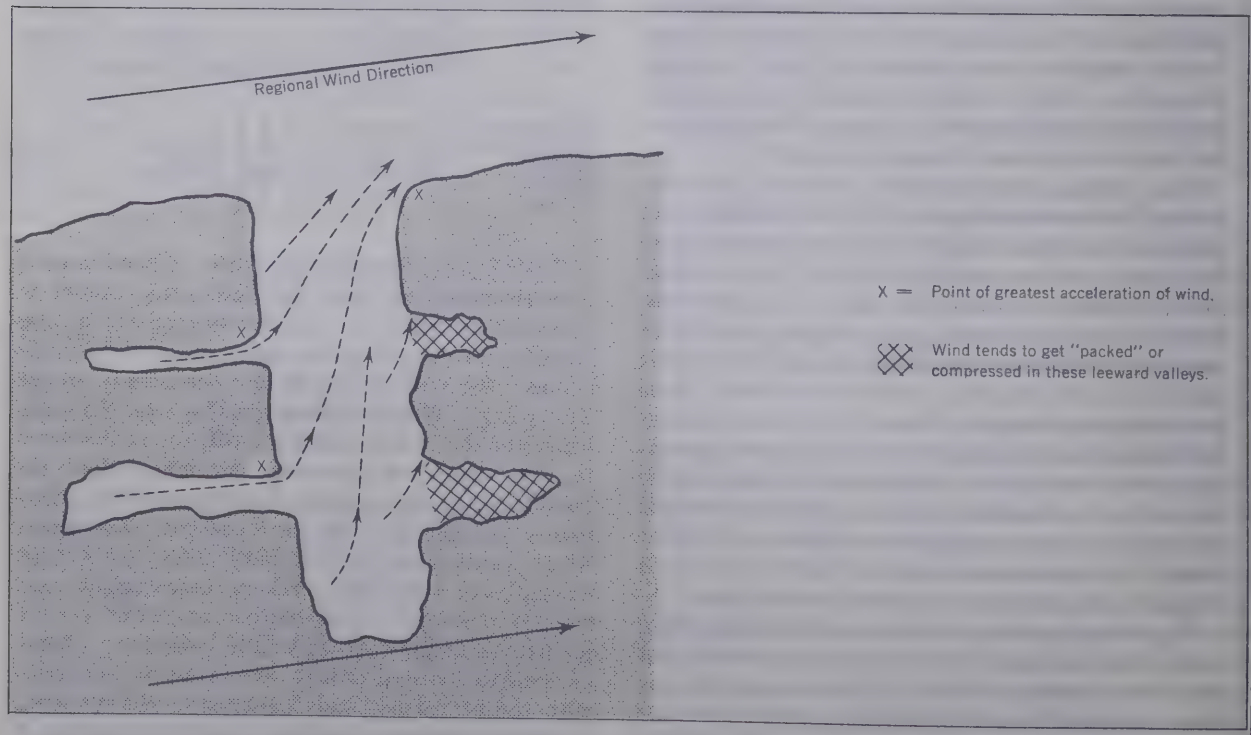
The sheltering effect of high ground.—Most of the fjords are bordered by hills or mountains rising anything up to 2,000 feet in a matter of one-half mile or so from the water's edge. This means that, with the exception of winds blowing along the axis of a fjord, the pressure gradient is most unlikely to give an accurate idea of the wind to be expected in the fjord—either of its strength or direction.

At Akureyri (Eyjafjord) in winter the average ratio between gradient wind strength and observed wind strength is more than 5:1, being somewhat higher (more than 6:1) for slack gradients and considerably lower (approximately 3:1) for tight gradients: further, the majority of the winds are northerly or southerly, i. e., they conform to the general trend of the fjord.

At Bolungavik, in the less deeply engulfed Isafjord, the corresponding ratio (gradient to observed wind) for the same season is approximately 5:2. After making allowance for the lowering of the ratio with increasing velocity, it still required, on the average, a gradient wind of 70 knots to produce a wind of 30

[6] From British Naval Meteorological Branch, Memorandum 108/42 of May 1942.

CHART 1.—Regional wind direction (near the mouth of a fjord).



knots in Isafjord and one of more than 100 knots to produce a similar wind in the more sheltered Eyjafjord. It follows from this that gales are rare in such fjords. In the winter 1940–41, for every six gales reported off the mouth of Eyjafjord, Akureyri reported only one. It is noteworthy, moreover, that the only time this station logged winds of force 7 or more was when there was a strong gradient for westerly winds (i. e., transverse to the axis of the fjord and producing, where unimpeded, a surface wind with a slight off-shore component): the wind in the jford was then southerly (i. e., off-shore). Inspection of the relevant daily weather reports shows that in practically every case the low concerned was centered to westward, giving a gradient for southerly winds (i. e., transverse to the fjord axis), the unimpeded surface wind being slightly off-shore. Other things being equal, the strongest winds are encountered (1) on the leeward shore near the mouth of the fjord and (2) where the wind emerges from the windward tributary valleys. (See chart 1, p. 16.) By contrast, the leeward valleys often prove to be comparatively sheltered. This has been explained as an effect of the "packing" of air between the high walls of the valley. The general wind thereafter tends either to "bounce" off seawards, or else to climb over the cushion of air so formed.

In summer the gradient-observed wind ratio is still high in sheltered fjords, though lower than in winter. Thus at Akureyri it has declined to approximately 4:1 and near Reykjavik to less than 2:1.

The cold air reservoir of central Iceland.—Another striking characteristic, summer and winter alike, is the greater velocity, gradient for gradient, of offshore winds. Offshore winds blow throughout the length of the fjord (Vestfjord) and usually blow harder than winds from seaward * * * it may happen that a wind may be blowing hard out of a fjord whilst outside there is a calm. At Reykjavik, in winter, the ratio gradient observed wind force is 2:1 for winds between SW. and NW. (i. e., onshore) and only 4:3 for winds between N. and E. (i. e., offshore). In Hvalfjord, in summer, the ratio is approximately 2:1 for onshore winds and 3:2 for offshore winds. For an explanation of this difference we must look to the cold, snow- and ice-covered "heart" of Iceland.

All the year round the elevated interior of Iceland is considerably colder than the coasts—witness the permanent ice-fields. In quiet weather the plateau acts as a sort of reservoir for the cold air draining off the snow and ice—a reservoir which is only tapped to any large extent when the plateau comes under the influence of a passing depression. Then, so it seems, the air is drawn, katabatic-fashion, into the valleys where, helped by the "funnel" effect of the topography, it proceeds seawards at ever increasing velocity.[7] However, once the reservoir of cold air has been temporarily exhausted, the wind slackens, even though the gradient is steady. In this connection it is interesting to note that all available reports confirm that fjord gales seldom last more than a few hours. The importance of the plateau as a cold air reservoir is exemplified in another way, namely, in the squalliness of fjord winds.

Now the heating power of the sun varies, among other things, with the angle at which its rays strike the earth. (See charts 2 and 3, p. 18). It follows, therefore, that the south-facing walls of Hvalfjord receive more insolation than the plateau above (probably at least 30–40 percent more round about July and August). It must also be borne in mind that the plateau is 1,500–2,500 feet (even more) above the fjord and that its mean air temperature is, on that account, appreciably lower even during the, middle of the day. By late afternoon, say 1700, the plateau and mountain slopes above the fjord are already losing more heat than they are receiving (especially those parts cast into shade by the declining sun), and the cooled surface layers of air are beginning their gravitational (=katabatic) flow. "Pools" of cool air collect in hollows and periodically spill over the plateau edge or down the mountain side. When the pressure gradient is northerly—the gravitational flow of air merely serves to increase the strength of the surface wind. Further contributing to this end is the fact that fjord-bottom temperatures usually attain their maximum somewhere about 1600–1700. This suggests that any convective tendencies the air may have will likewise be most apparent round about the same time. Now where can the air feeding a convectional column at the bottom of a fjord come from? (*a*) From the sea surface—*vide* onshore winds which are apparently at their maximum frequency round about 1800 (see under Diurnal Wind Variation, p. 19), and (*b*) from the cooler plateau above (*vide* chart 3, p. 19). In fair weather, and provided the pressure gradient is slack (less than 15–20 knots), (*b*)'s contribution is not likely to be as considerable as (*a*)'s, for sea breezes are much more frequently reported at c. 1800 than land breezes. However, in these northern latitudes sea

[7] When there are no depressions in the offing, and the air flow is purely katabatic, its strength decreases with distance from the windward end (i. e., the head of the fjord). More than one ship using Seydisfjord during the winter has remarked on the contrast between the strong winds periodically encountered near head of the fjord and the light winds prevailing near the mouth.

breezes are easily discouraged and an offshore pressure gradient of 20 knots only needs to be slightly reinformed—as it would be by the gravity flow of cool air from the heights above—to cancel out the sea breeze altogether and replace it by an offshore wind Initially, this wind will probably be rather squally, partly owing to orographic influence (the rate of surface cooling and of gravity flow are intimately connected with the bordering relief), and partly to the fact that there will be a temperature discontinuity (if only slight) between the sea breeze and the down draught of air coming off the cool plateau.

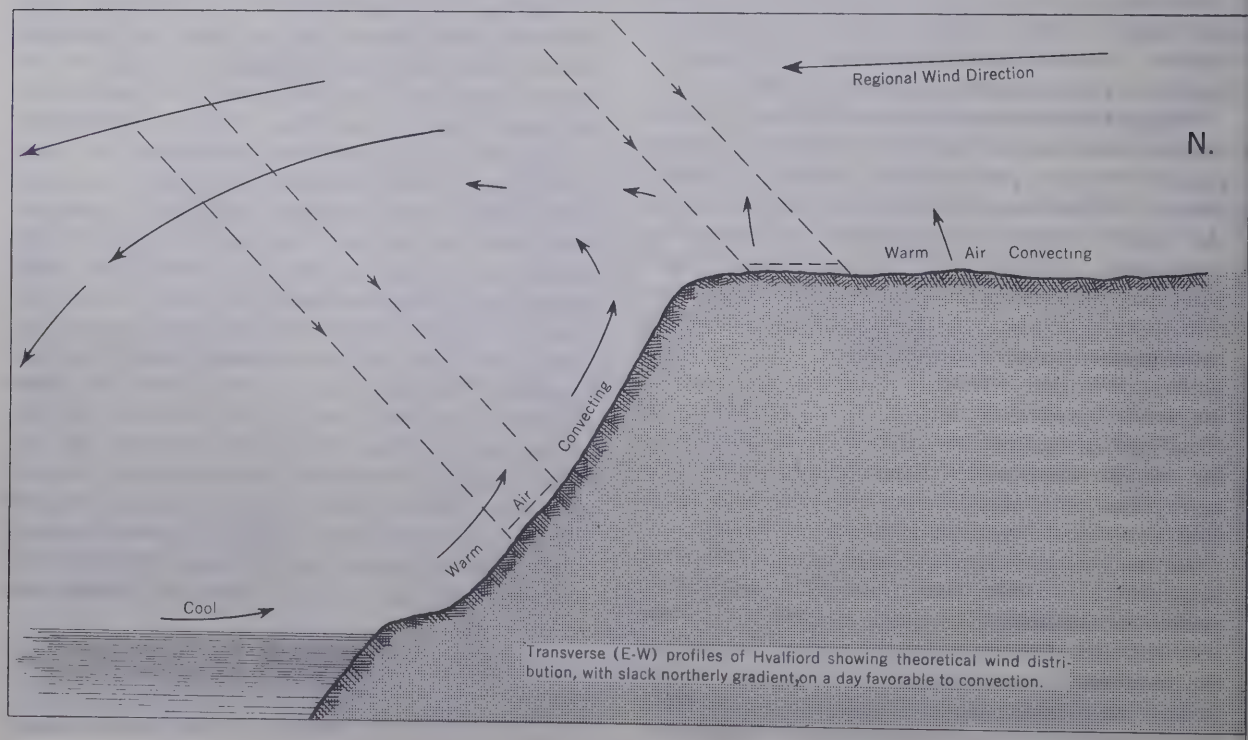
It seems, furthermore, that this view of local wind causation helps to explain another point, viz, why winds are sometimes reported blowing in opposite directions in different parts of the same fjord. It frequently happens, even in summer, that a vessel will sail into a fjord with a fresh wind from seaward, and when she has entered a little way, encounter calms with strong mountain squalls. Where conditions favor late afternoon convection, e. g., SW. aspect, the sea breeze will continue to blow until after 1800 (see later), but where they do not, e. g. SE. aspect, the gravitational flow of cooler plateau air will replace it earlier.

Of course, when the gradient is so tight that there can be no question of a local sea breeze reversing the general wind, then it may well be that the local wind diversities which are sometimes reported when strong winds blow athwart the fjord are eddy effects and have nothing to do with convection. Even so, much will depend upon the topography of the fjord. Where the fjord is continuously flanked by high cliffs or mountains, as in the case of Seydisfjord and Eyjafjord, the chance of a lee eddy reversing the general wind is small, except close against the cliff edge, and even then the effect will only rarely extend beyond the foot of the fjord. Thus Akureyri, near the head of Eyjafjord, only once showed a reversed lee eddy out of a total of more than 50 occasions of strong pressure gradients; while a British ship, stationed off Akureyri during a period of strong cross winds, did not report a single case of lee eddy. (See chart 4, p. 20.) She did, however, make the observations, that "stronger and more violently gusty winds may be expected from south and SE. than from the northerly quarter, this being natural to the abrupt mountains enclosing the head of the fjord."

The story is rather different in a fjord like Hvalfjord, where, instead of a continuous wall of high

CHART 2.—Regional wind direction (katabatic flow).

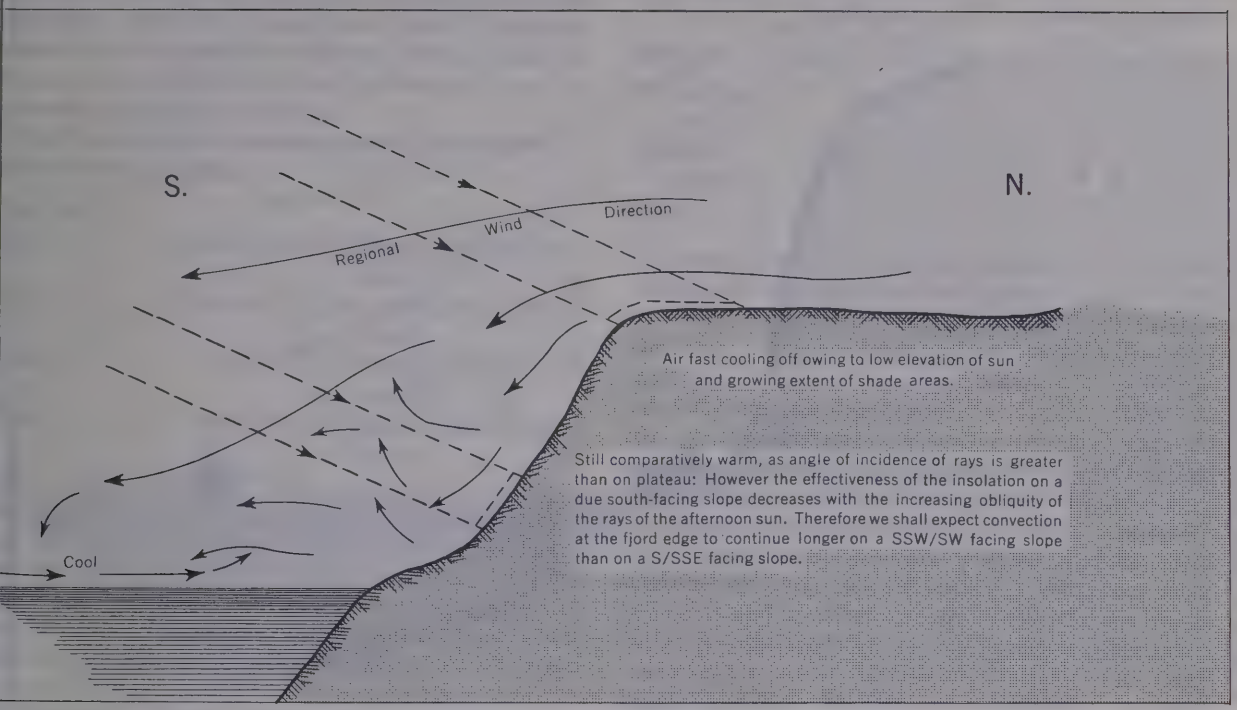
NOON—SUMMER.



Transverse (E-W) profiles of Hvalfiord showing theoretical wind distribution, with slack northerly gradient, on a day favorable to convection.

CHART 3.—Regional wind direction (katabatic flow).—Continued

LATE AFTERNOON—SUMMER.



ground enclosing the waters on either side, there are lofty peaks and mountain masses alternating with quite extensive tributary valleys and lowland gaps.

The acceleration of wind down these valleys and through the gaps favors gustiness and eddy formation at the entrance to the fjord, i. e., where the funnel effect is suddenly terminated. (See chart 5, p. 20.) All the same, *reversed* winds are not common, if we exclude palpable land and sea-breeze effects. Out of more than 100 observations of winds of force 4 and over, in Hvalfjord, there was not one of a wind blowing diametrically opposite the general wind, and less than 10 occasions when the wind departed by more than 90° from the general wind direction. But near the cliffs overhanging the fjords reverse eddies are apparently very common.

It is probably this topographical factor in Hvalfjord which accounts for the fact that the mean departure of observed wind direction from gradient wind direction is greater when the gradient wind is blowing across the fjord than when it is blowing up and down the fjord—56° against 40°. At the same time this is not to say that winds over the water in Hvalfjord are capricious and unpredictable. Five out of every six blow across the isobars with the proper inclination, i. e., high to low pressure.

Diurnal wind variation.—This is a most conspicuous summertime feature in those fjords for which observations are available.

Variation of wind force.—At Akureyri in the summer of 1940 the mean wind speed for the main reporting hours was as follows:

Local time		
Midnight	2.2 knots	=22% of the mean gradient wind speed.
0600	2.0 knots	=18% of the mean gradient wind speed.
1200	3.6 knots	=25% of the mean gradient wind speed.
1700	3.8 knots	=28% of the mean gradient wind speed.

A complementary trend is seen in the occurrence of calm conditions; in July and August (1940) 29 calms were reported at midnight, 26 at 0600, 13 at 1200, and only 6 at 1700.

The variation of speed is most noticeable at Akureyri with southerly (=offshore) winds, and it is not

CHART 4.—Transverse profile of Eyjafjord, near Akureyri, showing lee eddy.

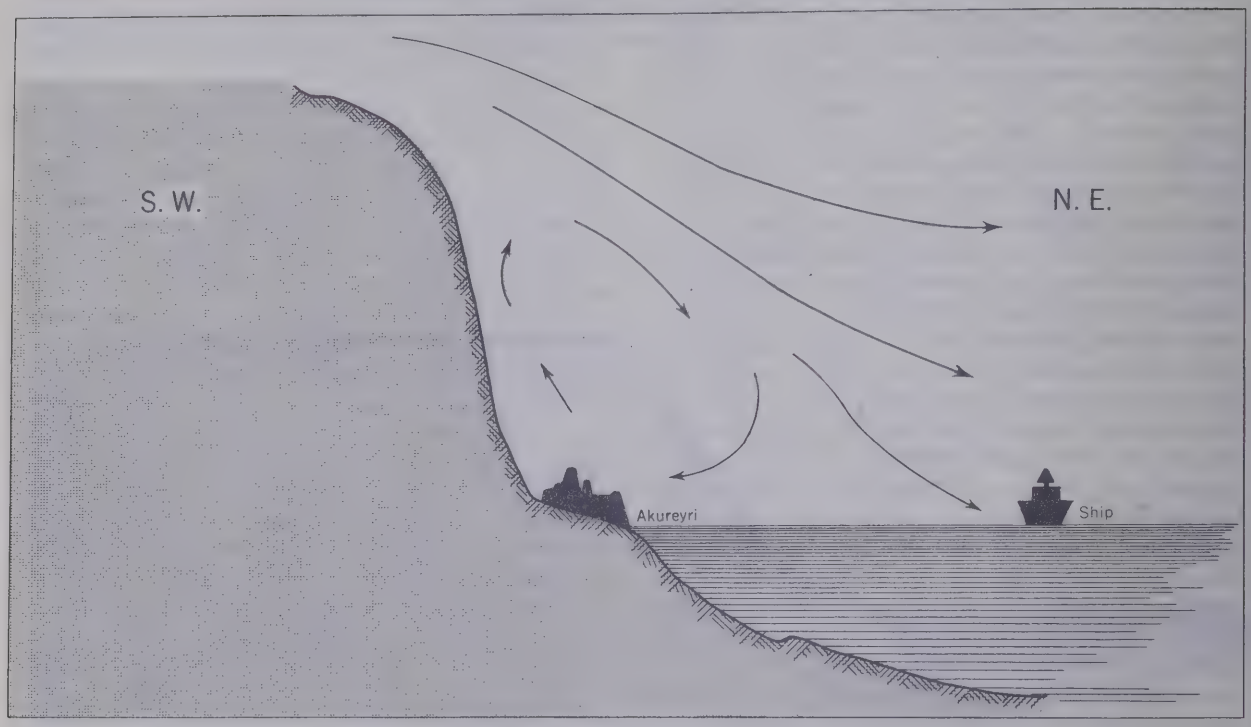
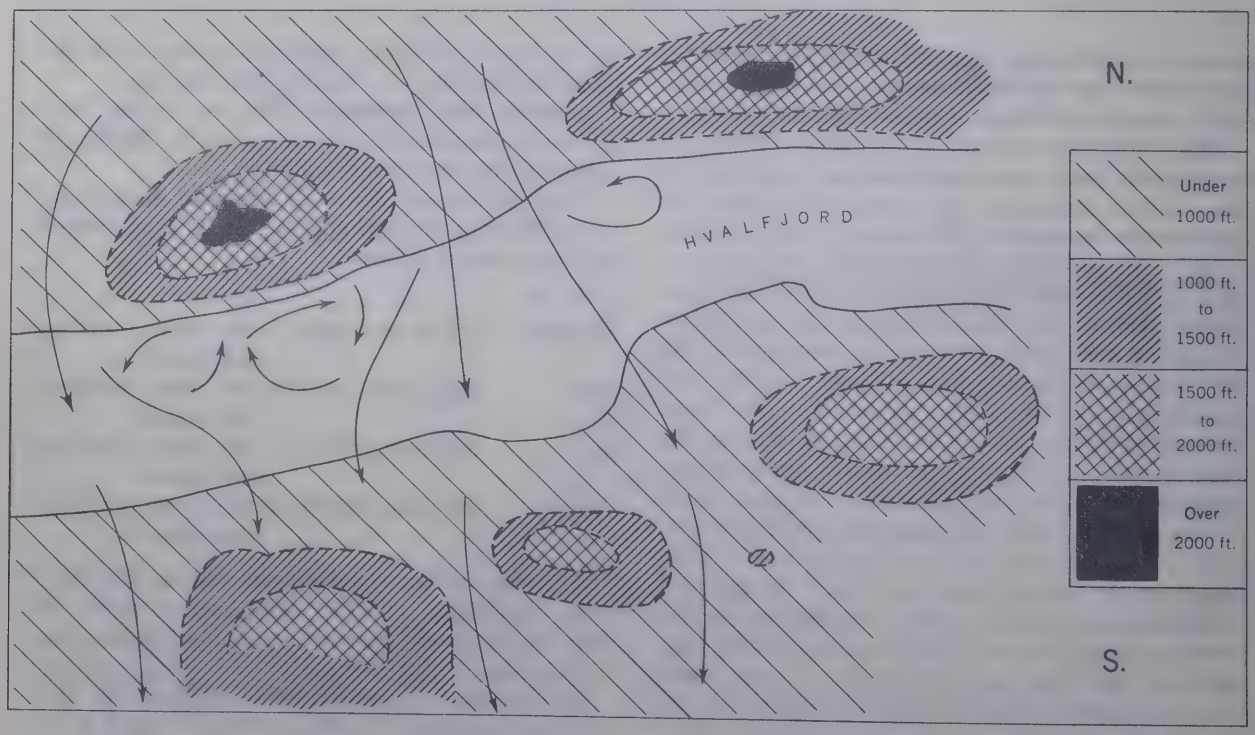


CHART 5.—Plan of part of Hvalfjord showing lee eddy.



vithout interest that southerly winds attain their naximum during the night (more than 8 knots at nidnight) when the mean wind speed—all direc-ions—is pretty well at its lowest. This we take to e another evidence of the importance, even in ummer, of cold air drainage.

In Hvalfjord, over the same period, the variation of nean wind speed was:

ocal time	
100	8.2 knots=47% of mean gradient wind speed.
700	9.5 knots=55% of mean gradient wind speed.
300	11 knots=66% of mean gradient wind speed.
800	8.7 knots=48% of mean gradient wind speed.

Here offshore (easterly) winds reach their maximum velocity during the early part of the night (12.4 knots t 1800 and 11.4 knots at 0100). Onshore (westerly) vinds have an equally well-marked daily rhythm nd are at their maximum strength somewhere etween 1300 (10.5 knots) and 1800 (8.7 knots), a fact vhich we attribute to sea-breeze effect.[8] This brings s to

Variation of wind direction.—This appears to be ven more marked than the variation of wind force. During July and August 1940 at Akureyri (where fully 5 percent of all winds blow from either a northerly r southerly point), the following aggregates were ecorded:

(*Local time*)	*Midnight*	*0600*	*1200*	*1700*
Northerly	15	14	33	43
outherly	13	19	13	9
Calms	29	26	13	6

The variation is still more striking when we con-ider only those winds and calms reported when the radient wind was less than approximately 20 knots:

(*Local time*)	*Midnight*	*0600*	*1200*	*1700*
Northerly	11	8	23	32
	19	21	6	2

[8] At Akureyri the sea breeze blows often enough to produce a very noticeable urnal variation of wind *direction* (see par. Variation of Wind Direction), but ving to the distance of the town from the open sea and the "built-up" mountain eas round about, it is too weak to affect the diurnal variation of wind *velocity* any extent. However, upon occasion the sea breeze blows fresh and may en hinder the working of cargo.

In Hvalfjord the corresponding numbers were:

	(*a*) *Winds of all gradients*				(*b*) *Gradients of less than 20 knots*			
Local time	*0100*	*0700*	*1300*	*1800*	*0100*	*0700*	*1300*	*1800*
Westerly (=onshore)	12	6	11	26	4	2	3	15
Easterly (offshore)	13	20	16	11	5	9	6	3
Calms	13	14	13	5				

If proof were needed of the existence of land and sea breezes in Arctic latitudes, these figures supply it. What perhaps is most surprising about them is that they come, not from an area of level low-lying land where such effects might reasonably be looked for, but from two deeply engulfed fjords.[9] Of course the coastal lowlands—where there are any—do experience land and sea breezes on a fairly substantial scale. Thus, near Reykjavik offshore winds (up to 15 knots "gradient value") are often completely neutralized in quiet, sunny weather, and are even replaced by light onshore breezes. With very slack gradients and in convective situations, the sea breeze blows near the Icelandic capital until late afternoon—considerably after 1700 (Local time)—and may reach force 3–4. Shortly after nightfall it is superseded by a land breeze which attains force 5 at times, yet another indication of the part played by cold plateau air in the climatic economy.

But Hvalfjord, for all its mountainous relief, produces quite comparable effects. Here the sea breeze will usually reverse the regional wind if the gradient is not above 10–15 knots and the midday cloud cover not more than 4–5/10s. (Up to a point, the lower the cloud amount at c. 1300 the stronger the resulting sea breeze and the greater its ability to reverse the gradient wind direction, but if no convectional clouds develop *over the land* during the daytime, the sea breeze is not likely to be very strong.) When there is a light onshore wind to start with in the early morning it frequently strengthens, under the influence of the sea breeze, to force 4. Exceptionally, when there is strong convection over the land and a negligible gradient, the sea breeze may reach force 5.

Within Hvalfjord the strength of the sea breeze,

[9] Sea breezes are generally more noticeable around hilly than around low-lying coasts. This is explained by the fact that in the former, valley winds (i. e., anabatic flow of warm air) reinforce the sea breeze.

even its presence or absence, depends largely on such matters as aspect, angle of slope of fjord wall, extent of suitable convective surface, and so forth. There is, for instance, a great deal of difference between the strength of local winds met with along the north-facing and south-facing slopes of the fjord.

In the more deeply engulfed Eyjafjord, the *reversal* of the gradient wind, due to sea-breeze effect, is rare—three to four times [10] in 2 months, but the extraordinary diurnal variation of northerly winds, when the gradient is slack—from 8 at 0600 to 32 [11] at 1700—cannot easily be explained except on the basis of a sea breeze.

Many more onshore winds are reported at 1700 and 1800 than 1200 and 1300 and more offshore winds at 0600 and 0700 than midnight and 0100. This time-lag is understandable when we bear in mind the low elevation of the sun and the length of the Arctic summer day. In Hvalfjord during the summer of 1940 the thermometer registered consistently higher temperatures at 1800 than at 1300 and lower temperatures at 0700 than 0100, thus:

MEAN AIR TEMPERATURE IN HVALFJORD: JULY 1940

(*Local time*)

0100	0700	1300	1800
50°	48°	52°	53.3°F.

(As this retardation is largely a function of the angle of incidence of the sun's rays, it is probably much less marked in fjords with an easterly than a westerly exposure.)

JAN MAYEN

The island is surrounded by ice during most and sometimes all of the year, though from June to August it may be free, if the cold current bears unusually far to the west of it. The climate is therefore mainly Arctic, although the records do not show that the temperature falls lower in winter in the extreme than at most northern Icelandic points, the minimum shown by various records being only −23° F. in December, which is equaled at Grimsey in January. Nevertheless, the annual mean of 28° F. to 30° F. is 5° F. to 7° F. lower than that at Grimsey, while its record high temperature of 59° F. in July and August is lower by 20° F. than the record high at the Iceland station. Midsummer temperatures at both places sometimes fall below freezing.

[10] On each of these occasions the midday (1200 and 1300) cloud cover—the critical factor, other things being equal—was never more than five-tenths or less than two-tenths. When the sky is more than eight-tenths obscured, sea and land breezes are practically nonexistent. When it is less than two-tenths obscured, the lapse rate is seldom sufficiently unstable to induce strong sea breezes.

[11] Nearly all these "gains" were at the expense of early morning calms.

The average precipitation is rather light, some 16 inches of rain and melted snow, despite the violent wind and snow storms of winter. The fall is lightest in summer and heaviest in autumn, although, out of the mean of 174 precipitation days, the greatest frequency of "wet" days is in winter, when snow falls on an average of about 2 days in 3. The heaviest cloudiness is in summer, but the cover average is eight-tenths to nine-tenths the year round. Strong to hurricane gales average to occur on about 32 days annually, mostly from October to April. The most prevalent wind is easterly, and most of the summer rains come with winds from that direction. Snow falls with little relationship to wind, whether northerly or southerly.

Fog is somewhat related to wind direction, since it occurs most often when there is an air movement from south-southeast. Often in summer dense fog continues for several days. Its average occurrence at the highest in July is on 13 days, and the lowest, in winter, on about 2 days monthly. This is based only on a 7-year record, with a mean frequency of 58 days annually.

WEATHER CONDITIONS FOR WINTER TRANS-ATLANTIC FLIGHTS [12]

This information is essentially preliminary in nature and substance inasmuch as any generalization made and conclusions drawn are based on a short period of operation. The meteorology of the Atlantic in winter as it affects aviation may be divided into three main headings which, in order of importance, are: Ice Accretion, Winds, Fronts.

Ice accretion.—Over the western two-thirds of the route, icing conditions may be expected at all levels in cloud and at the lower levels in precipitation, while over the eastern third the icing level seldom falls to the surface. Thus, over the eastern third of the course it is possible to operate regularly below the icing level, whereas in the western two-thirds it is necessary for regular operation to fly above all serious icing. The heaviest ice occurs at fronts or near the centers of depressions. In cold fronts the icing is severe only in the lower levels (below 10,000 feet). In warm fronts the icing layer is more extensive and more severe than at cold fronts, but normally is not a hazard above 14,000 feet. In sharp occlusions or near the centers of deepening depressions heavy icing may be expected at all levels up to the cirrus level. Flights through such

[12] From report "Meteorology of winter trans-Atlantic flights between Newfoundland and the British Isles, 1941," by a meteorologist at the Newfoundland Airport at Gander Lake.

icing layers can only be attempted with safety above the level of clear (glaze) ice. This level is set at present as between the 5° F. and —0.4° F. isothermal surface depending on the intensity of the convection. The only other source of severe icing is in the cumulus and cumulo-nimbus clouds in air masses of polar origin. These air masses, after leaving the east coast of North America, are rapidly warmed in the lower layers by passage over the Gulf Stream. This results in a heavy cumulus and cumulo-nimbus development which, not depending on solar radiation, persists throughout the night and day. This warming continues during the entire time of passage of the air across the Atlantic and consequently the cumulus development increases throughout. Thus, the air mass becomes very moist up to 15,000 or 20,000 feet and increasingly heavy icing can be expected up to these levels as the air mass becomes modified. In daylight flights gaps in the cumulus development can usually be found so that ascent and descent through the icing layer is possible, but at night such a course would be impossible and aircraft would have to remain above or below the layer. In the western Atlantic this icing layer extends from the surface to 10,000 feet and in the eastern from 3,000 to 20,000 feet. The icing conditions thus make it essential that for regular operations an aircraft must be equipped for sustained flight at 20,000 feet, have de-icing equipment sufficient to handle all icing up to heavy rime, and have sufficient range to fly from east to west at 20,000 feet.

Winds.—The North Atlantic in winter is seldom without a gale somewhere between Newfoundland and Ireland, and surface winds are subject to continual rapid and violent changes in direction and speed. The winds at the higher levels (20,000 feet) are not subject to such violent changes. The prevailing direction appears to be west, but the velocities are slightly higher than the resultant of an appropriate thermal correction to the geostrophic wind. The mean westerly components of the wind at 20,000 feet between Newfoundland and the United Kingdom appear to normally vary between 44 and 45 knots.

Fronts.—(*a*) Frontal weather over the North Atlantic differs considerably from that over North America. Warm fronts are on the whole of greater extent, ceilings at warm fronts drop to 32° F. Vertically the cloud extends to the cirrus level but except in very sharp or newly developed warm fronts is stratified and above 16,000 feet ceases to be of significance except insofar as the cirrus prevents the navigator from taking star sights. Cold fronts are intense in the lower levels but between the altocumulus and cirrus clouds the air is usually clear except for isolated cumulo-nimbus heads, so that flights can normally be made at 16,000 to 18,000 feet with safety. Occlusions present the most serious problem. Freshly occluded fronts have unbroken cloud from the surface up to above 25,000 feet with heavy clear (glaze) ice below the 5° F. to —0.4° F. isotherm and heavy rime above. Unlike continental occlusions, the clouds do not become stratified until fairly well on in their life history.

(*b*) Wind shifts and temperature discontinuities at sharp fronts occur at 20,000 feet with magnitudes comparable to those at the surface. At weak fronts whose cloud structure does not extend to 20,000 feet or is considerably stratified at this level, wind shifts and temperature changes are considerably less marked than those at the surface and in many cases may not be observed at all.

UPPER AIR WINDS

The upper air wind data presented here are based on eight coastal stations in Greenland and Iceland and two inland stations in Greenland, a list of which appears in the following table 9.

TABLE 9.—*List of stations, period of record, location*

Station	Period of record	Location	
		Latitude N.	Longitude W.
		° ′	° ′
Reykjavik, Iceland	1932, 1933,[1] 1921, 1922, 1923, 1927, 1928, 1929.	64 06	21 54
Akureyri, Iceland	1909, 1912, 1913, 1927, 1928 [2]	65 42	18 00
Adalvik, Iceland	July 10–23, 1926; June 24–July 30, 1927.	66 18	23 06
Myggbukta, Greenland	June 18–Aug. 10, 1927	73 30	18 45
East Station, Greenland	August, October–December 1930; January–July 1931.	71 10	24 24
Angmagssalik, Greenland	June–August 1933	65 36	37 34
Mount Evans, Greenland	July 1927–July 1929	66 51	50 55
Eismitte, Greenland	Sept. 3–Oct. 4, 1930; May 28–July 18, 1931.	70 54	40 42
Camp Scott, Greenland	Sept. 2, 1930–Apr. 27, 1931	72 49	55 06
MacGregor Arctic Expedition Station.	September 1937–June 1938	78 20	72 42

[1] Observations taken very irregularly except during polar year August 1932–August 1933.
[2] Observations taken very irregularly.

The data are presented by seasons and values are given for the levels: Surface, 1,600; 3,300; 6,600; 9,800; and 13,100 feet above sea level for all stations except Eismitte, where data are given for the levels: Surface, 13,100; 16,400; 19,700; 23,000; and 26,200 feet above sea level. Wind velocities are given in knots and directions to 16 compass points. Wind roses are shown graphically in the accompanying charts, while resultant winds, average velocities, and velocity frequencies are shown in tabular form.

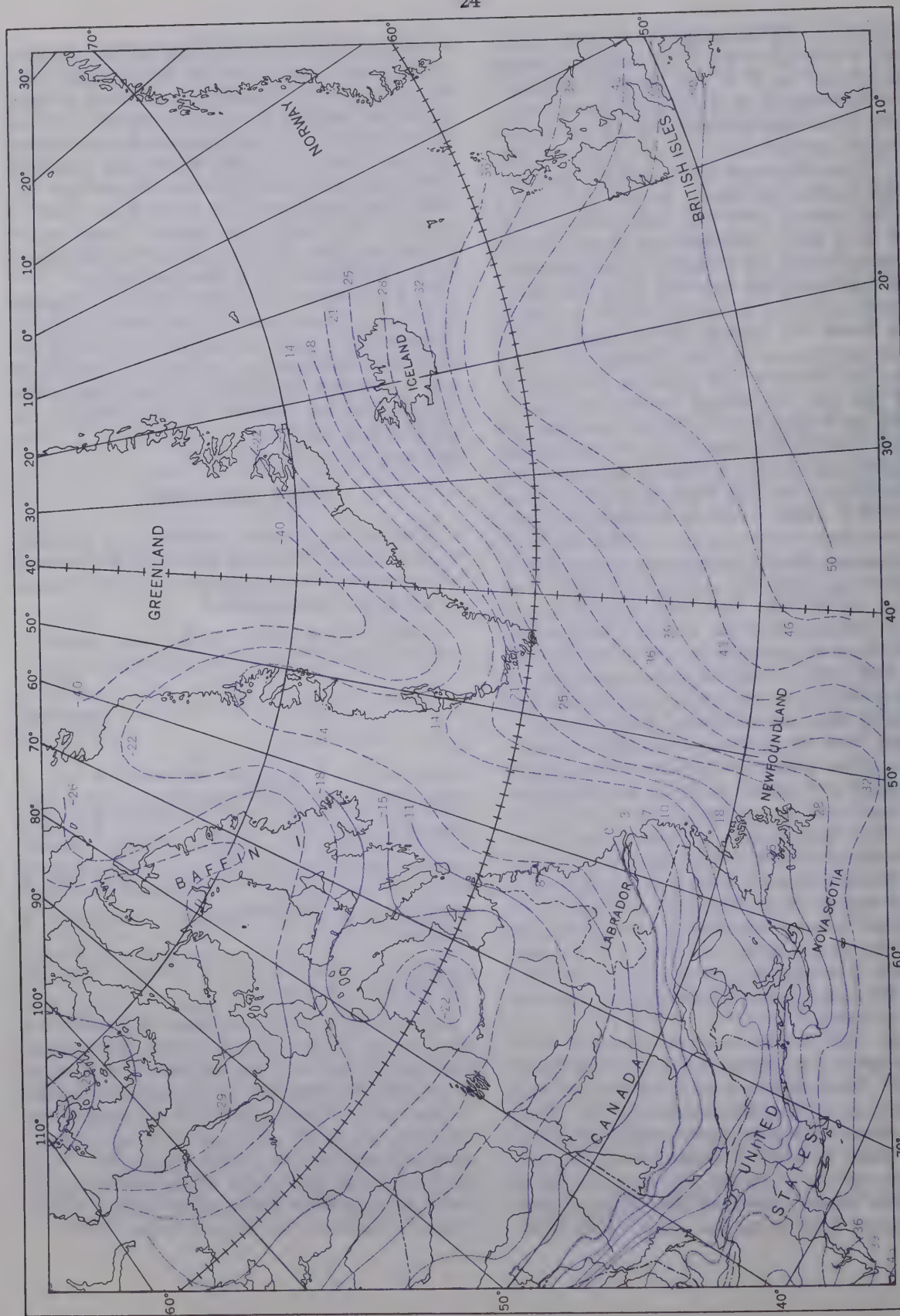


CHART 6.—Actual temperature, January (° F.).

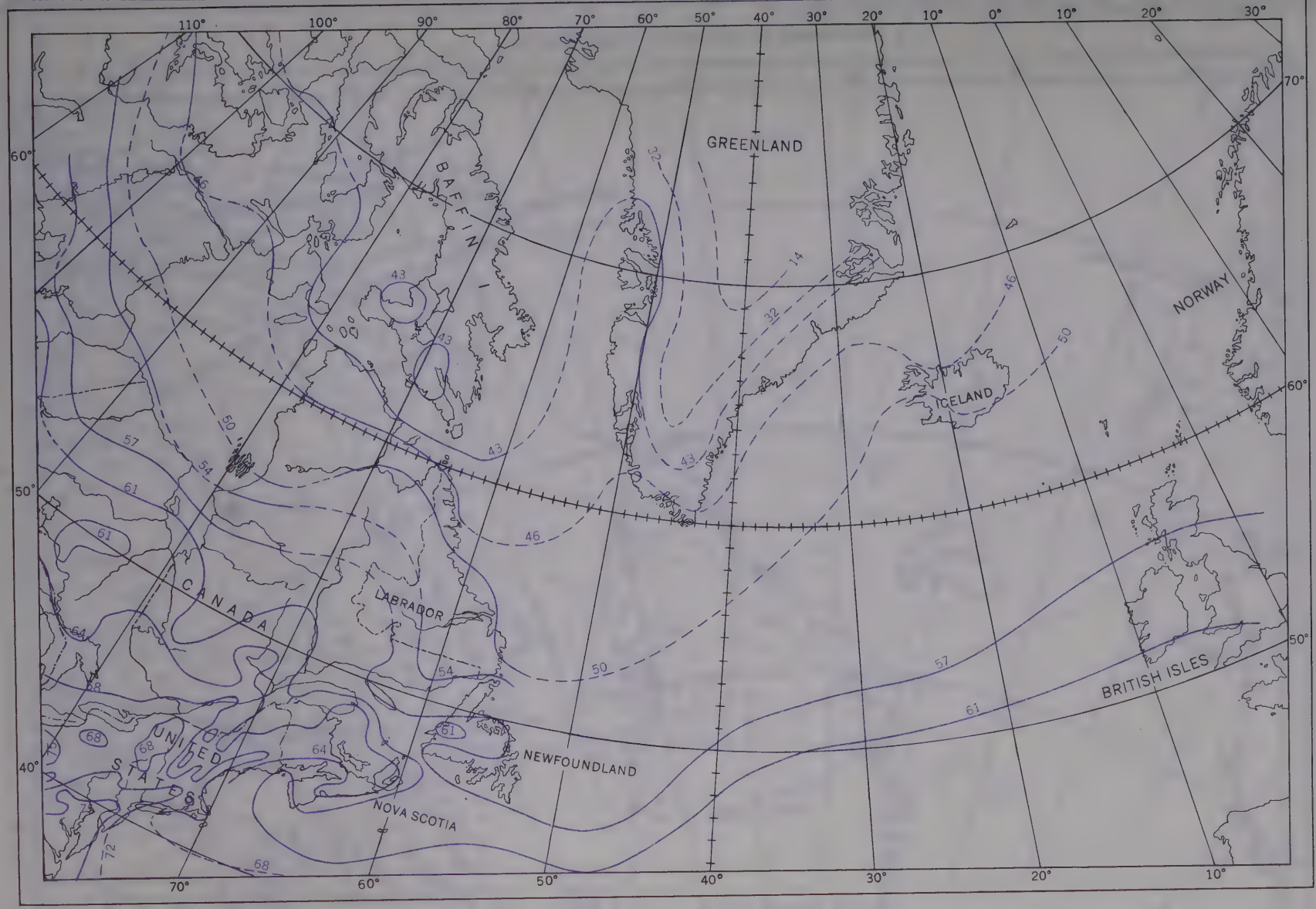


CHART 7.—Actual temperature, July (° F.).

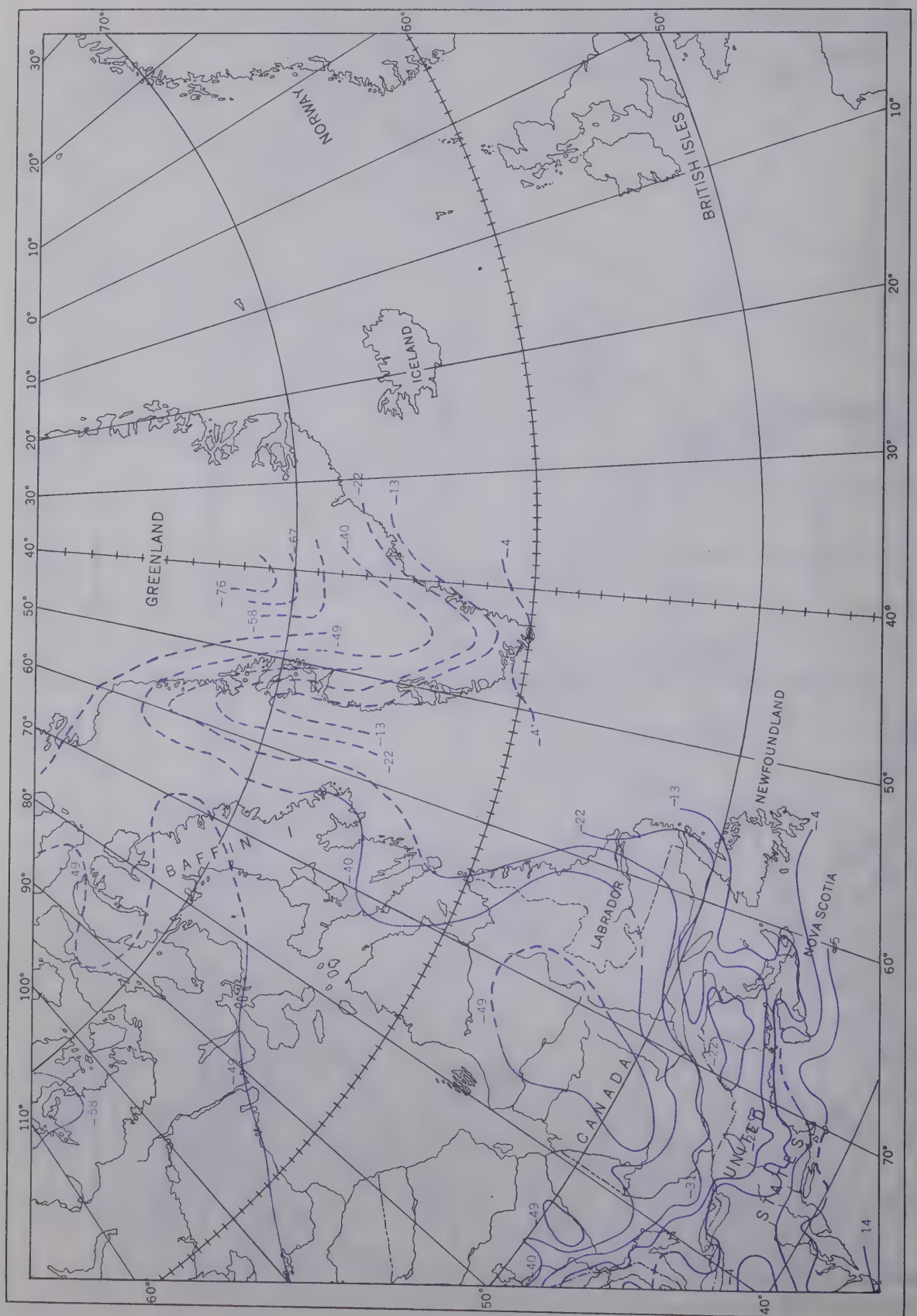


CHART 8.—Mean annual minimum temperature (° F.).

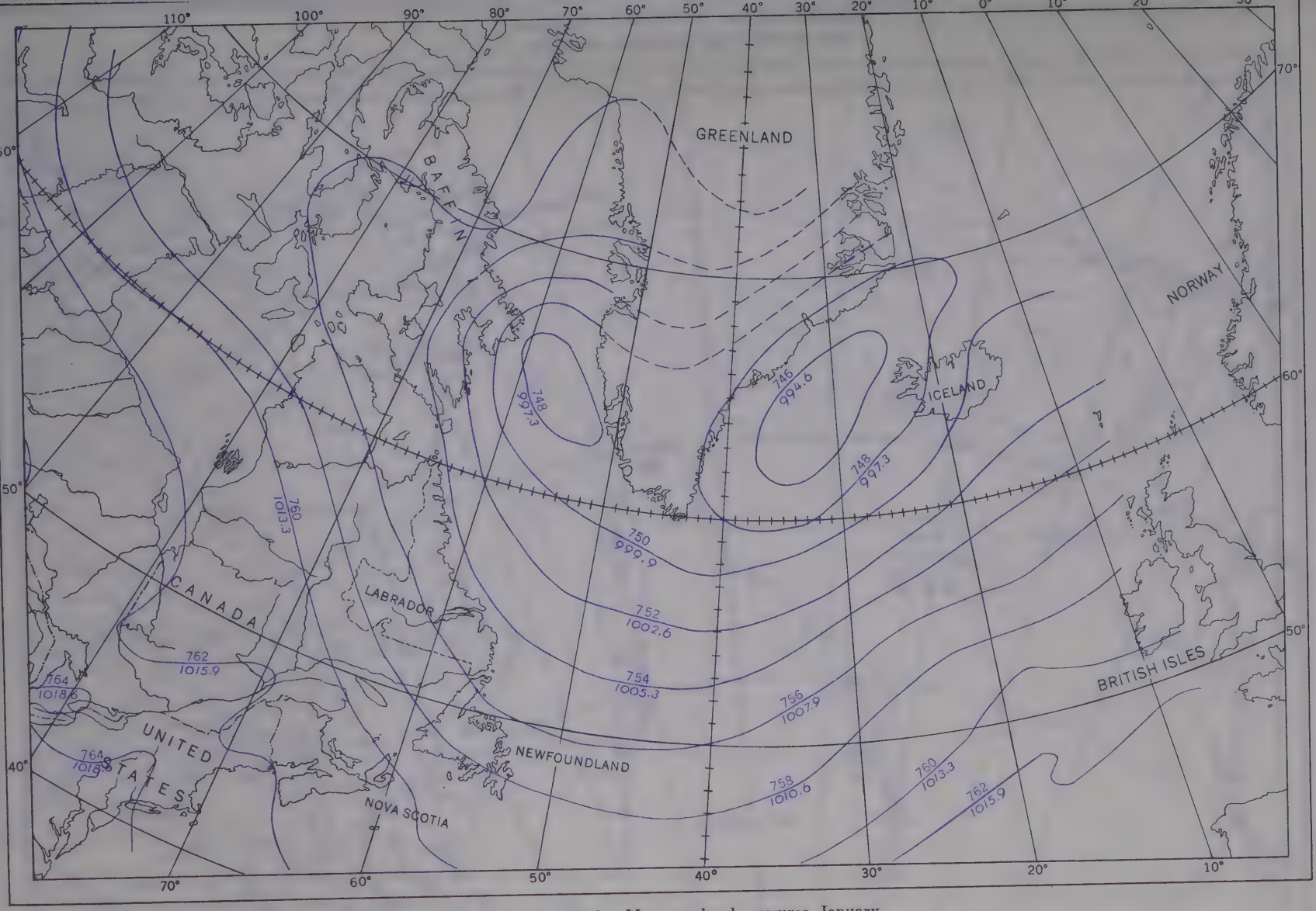


CHART 9.—Mean sea level pressures, January.

[Vertical figures mm. of mercury. Italic figures in millibars.]

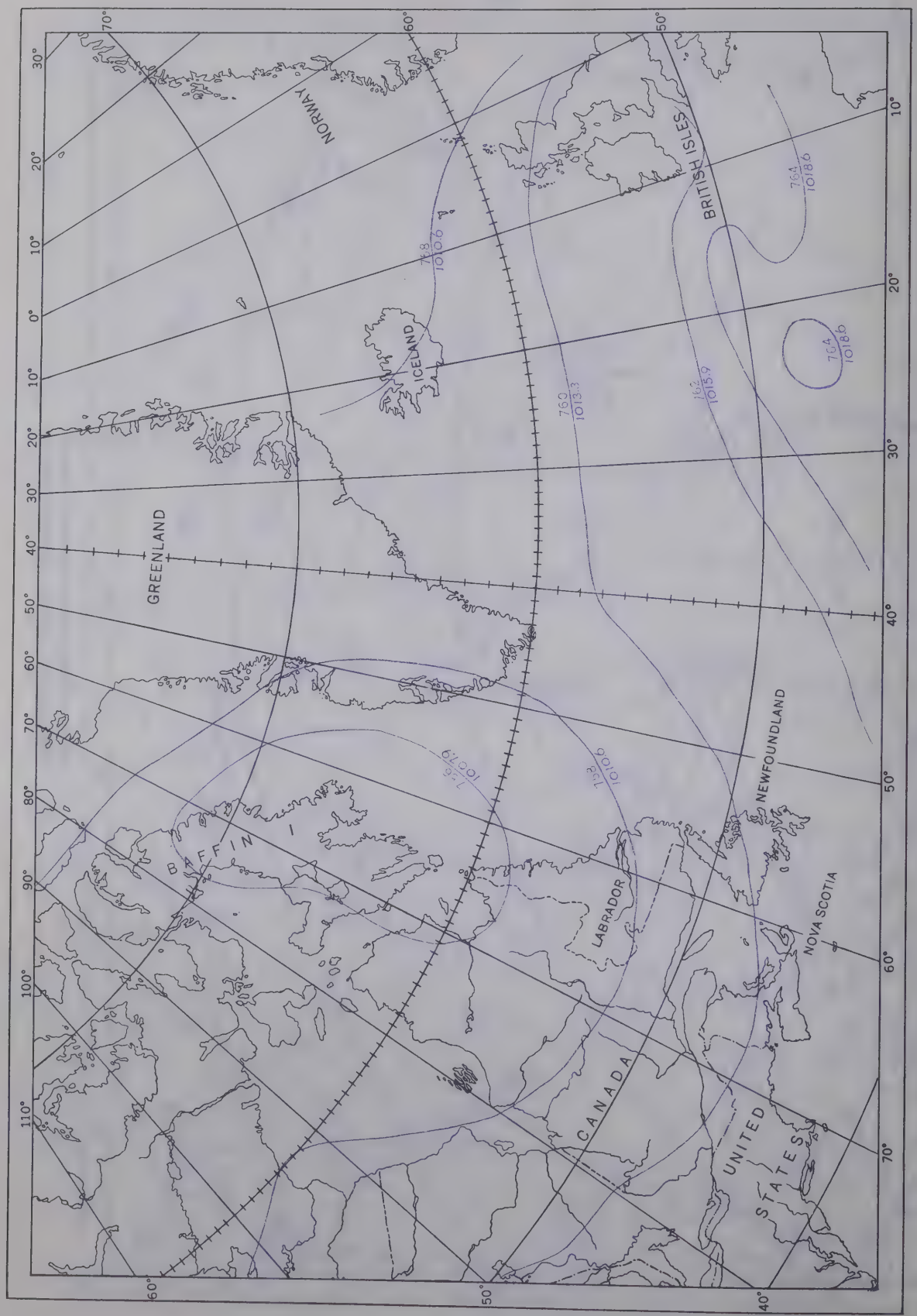


CHART 10.—Mean sea level pressures, July.
[Vertical figures mm. of mercury. Italic figures in millibars.]

CHART 11.—Mean annual rainfall in inches.

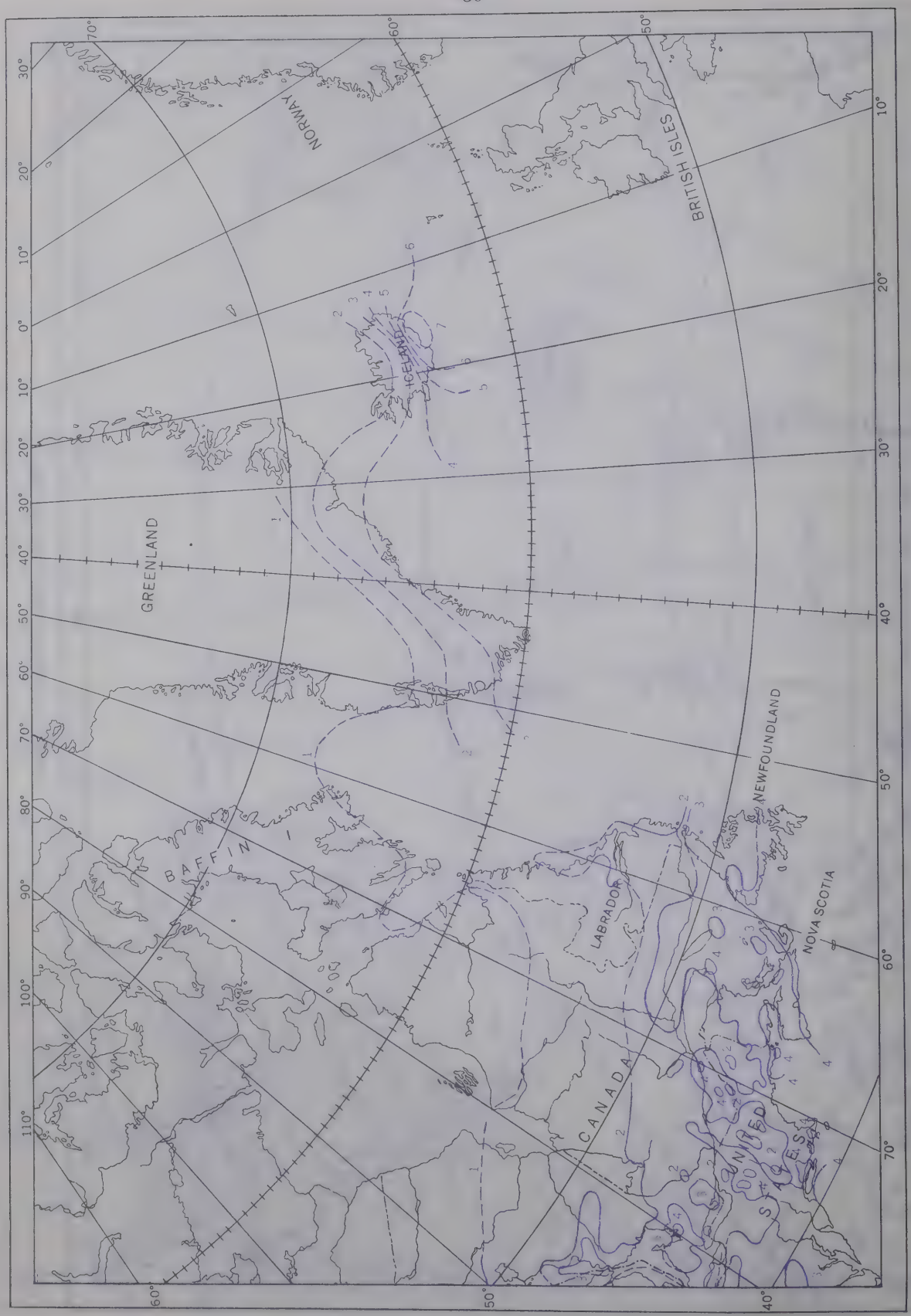


CHART 12.—Mean January rainfall in inches.

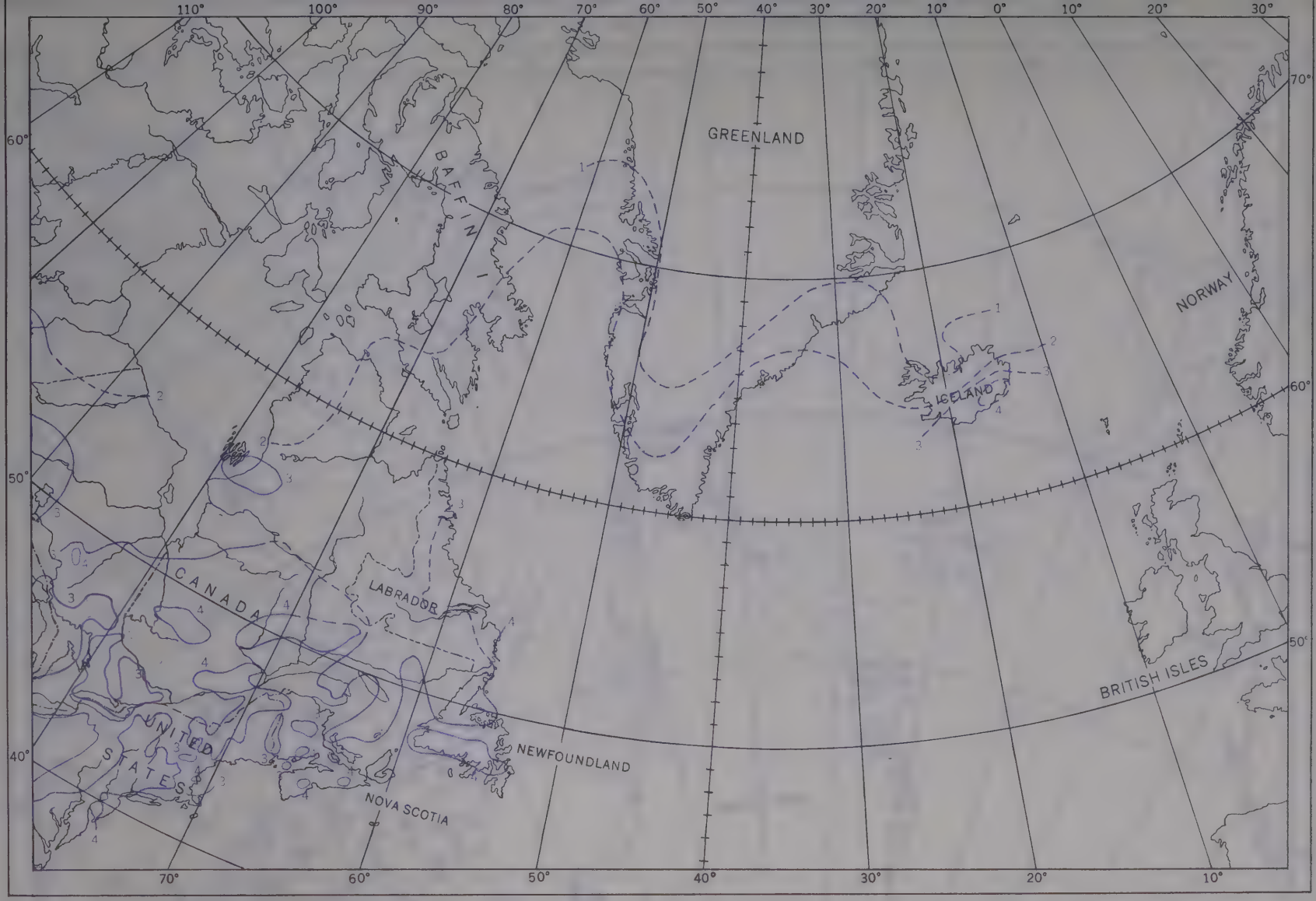


CHART 13.—Mean July rainfall in inches.

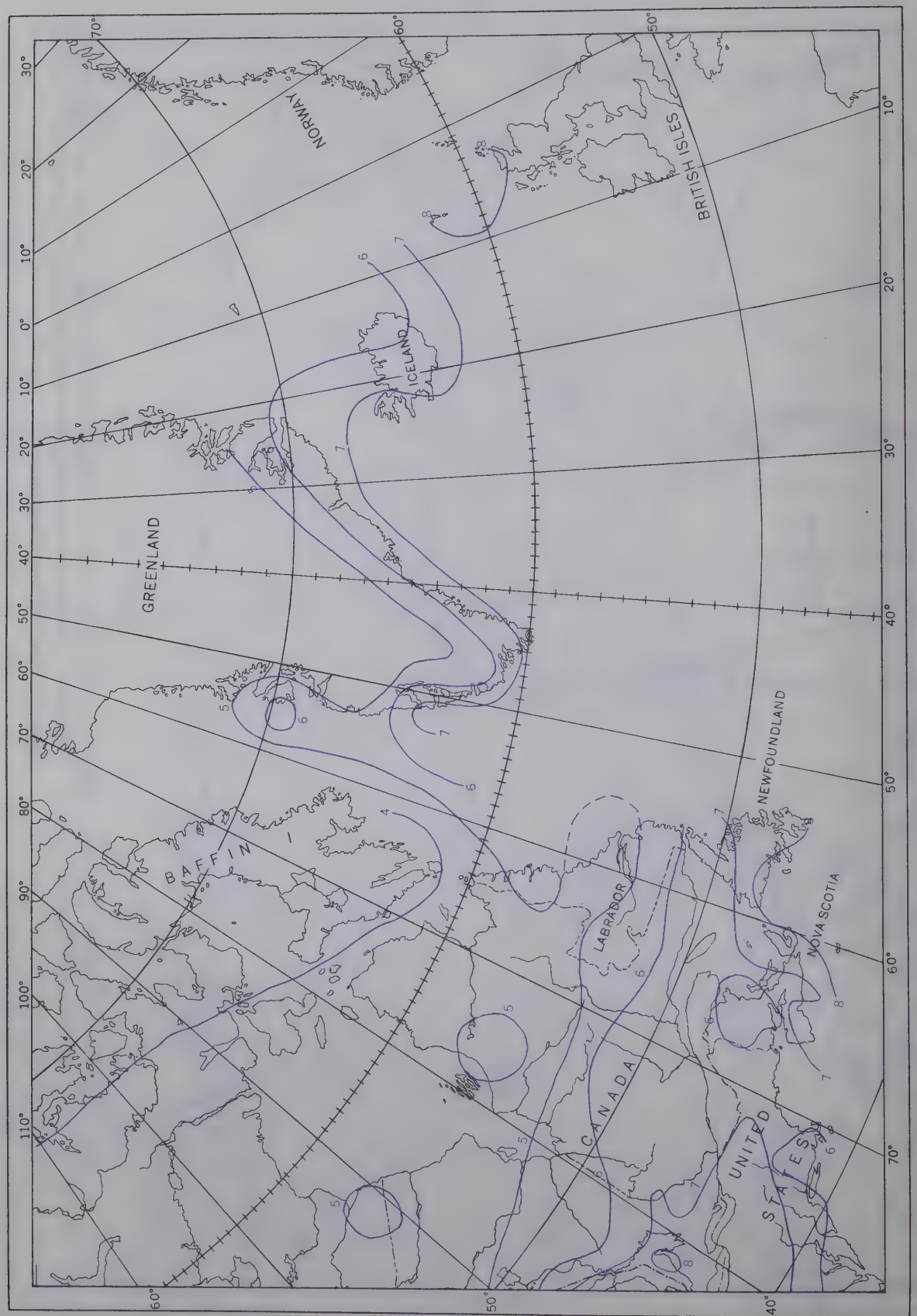


CHART 14.—January daytime cloudiness in tenths.

CHART 15.—July daytime cloudiness in tenths.

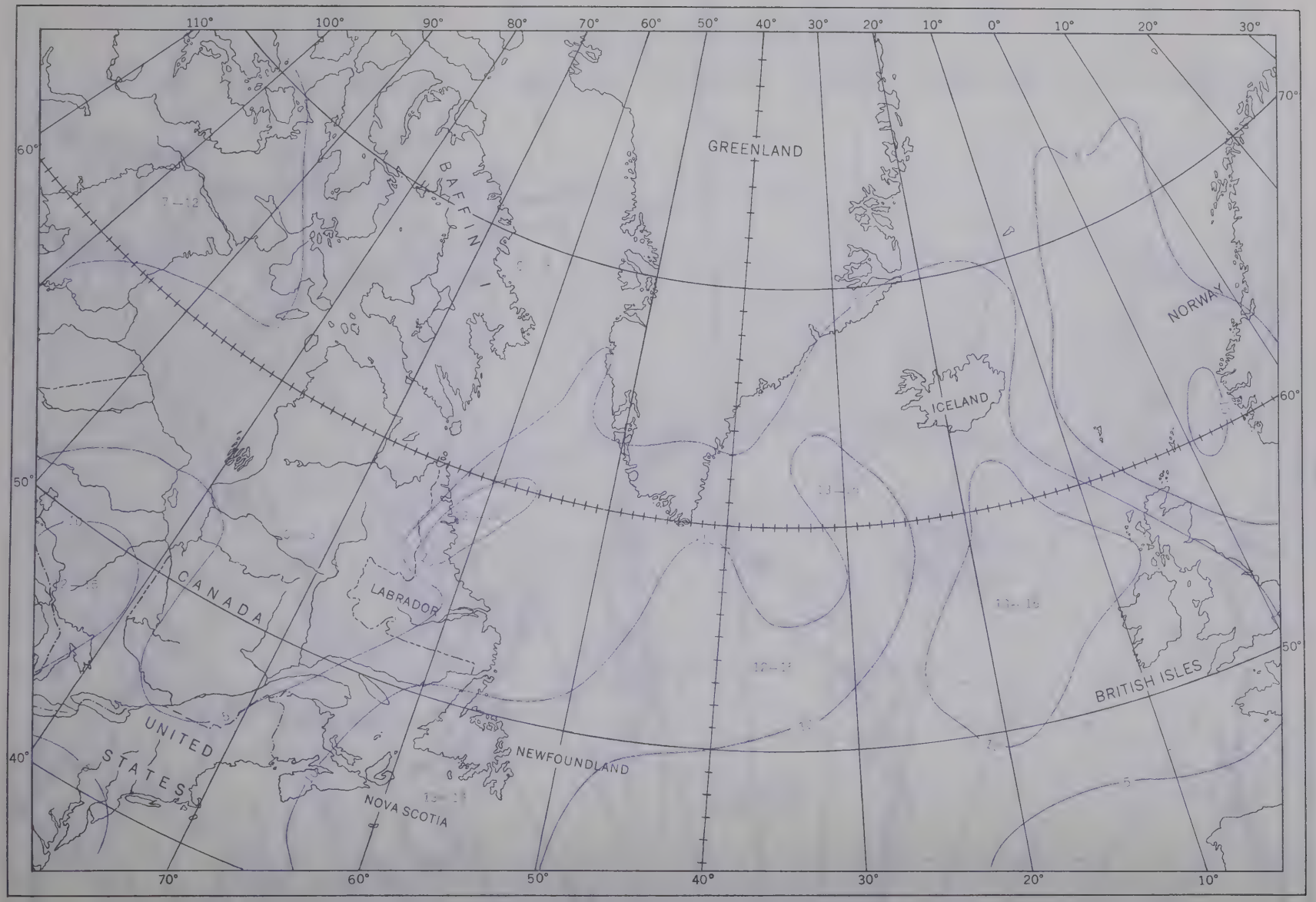


CHART 16.—Frequency of cyclones, winter conditions.

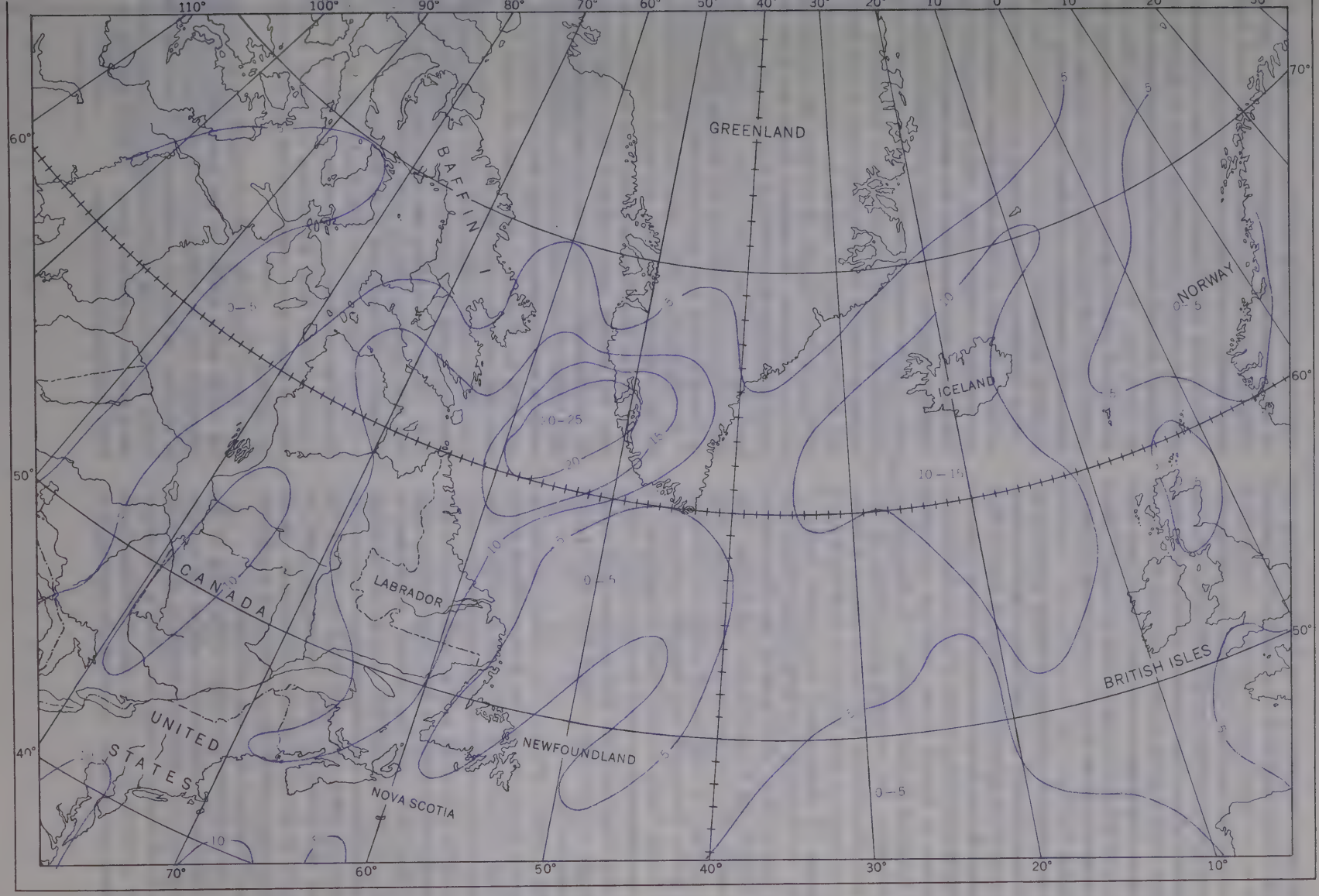


CHART 17.—Frequency of cyclones, summer conditions.

The data summarized here leave much to be desired from a statistical viewpoint. To mention a few of the limitations of the data: Since much of the data was collected by special expeditions, the observations frequently cover only part of a year or season. Sometimes several observations were taken on 1 day and then none were taken for a week or longer. Observations are few at best and were taken over widely varying periods of time. These limitations should be kept in mind when studying the tables.

Since the data are, in general, widely separated as to distance, period of observation, and in some instances by topographic conditions, it seemed best to discuss the winds at each station separately.

Particular attention is called to the observations at stations in Iceland where there are apparently large variations in wind direction. In this instance the differences are probably due entirely to the fact that observations were taken over a different period of years at each station, or that too large a percentage of observations were taken during 1 month. At Akureyri most of the observations were taken before 1914, while most of the observations from Adalvik and Reykjavik were taken after 1926. At Adalvik 69 of a total of 83 observations were taken in July. A difference of only a few hundred miles in the location of the Icelandic low-pressure areas during these periods would be sufficient to cause the differences in wind direction noted. This suggests a large variation between years and shows the danger of considering records for a short period as representative.

Wind roses.—During the winter season at Reykjavik the prevailing wind is from east or southeast from the surface to about the 6,600-foot level, and then shifts to west or northwest above that level. In spring the prevailing wind is again east or southeast through the 6,600-foot level, but shifts to north above that level, with less westerly winds than in winter. In summer the shift to a prevailing north wind takes place at the 3,300-foot level with prevailing west and northwest winds below that level. In autumn the prevailing wind remains at north or northeast at all levels through 13,100 feet. In all seasons except summer the percentage of winds from west and northwest increases with altitude.

At Akureyri, although results are limited by the small number of observations in winter, the prevailing winds are from southerly directions at all levels in nearly all seasons, except that there is a tendency toward northwest at the 9,800- and 13,100-foot levels in summer and autumn. Although the percentage of winds from a southerly direction is large at all levels in all seasons, the percentage of southerly winds decreases and the percentage of northwest and west winds increases with altitude in all seasons.

At Adalvik where data are available for the summer season only, the prevailing wind is easterly or southerly through the 9,800-foot level and northwest at 13,100 feet. The same tendency as was noted at Akureyri is evident; i. e., increasing percentage of winds from west and northwest with altitude and a decreasing percentage of winds from easterly and southerly directions.

East Station near Scoresbysund, is the only station on the east coast of Greenland where observations are available for all seasons. The observations at this station show somewhat the same pattern for all seasons. Near the surface, the prevailing winds are calm or light easterly, but shift rather abruptly to a westerly or northerly direction above the surface. In winter and spring the prevailing wind is west from the 1,600-foot level to about the 6,600-foot level; above this level through 13,100 feet, the prevailing wind is southwest. In summer, winds are light or variable through the 1,600-foot level and above this level the prevailing wind is from the north. In autumn, above the surface, the greatest percentage of winds is from west and northwest.

At Myggbukta, where observations are available for the summer season only, the winds agree closely with those at East Station, being light southeasterly near the surface and northwest above that level. At Angmagssalik, where observations are also available for the summer season only, the prevailing wind remains east northeast through the 13,100-foot level, but with an increase in percentage of winds from west and northwest with altitude.

At Eismitte (elevation 9,842 feet) in the center of Greenland, data are available for the summer season only. From a prevailing east wind near the surface the wind shifts gradually northward with altitude becoming north-northeast at 26,200 feet.

On the west coast of Greenland, data for three stations are available for all seasons, except that the summer season data are lacking at Camp Scott. Also, at Camp Scott, wind velocities for the surface are lacking.

At Mount Evans the effect of winds blowing off the ice cap is quite evident in the lower levels. From prevailing east or northeast winds near the surface, a gradual turning to southward with altitude is noted, the prevailing wind being from the south from the 6,600- to 13,100-foot level. There is apparently little variation between seasons.

At Camp Scott, near Upernivik, the effect of the ice cap in causing easterly winds near the surface is again seen. With altitude, prevailing winds shift from easterly and northeasterly at the surface to northwesterly and then to southerly above 3,300 feet during the winter and spring seasons. Autumn ends the shift from easterly at the surface to westerly with altitude.

In winter, at the MacGregor Arctic Expedition station near Etah, the prevailing wind is northeast from the surface through the 3,300-foot level, is east at 6,600 feet and southeast at 9,800 and 13,100 feet. In spring the prevailing wind is northeast at all levels, but of decreasing constancy. In summer the prevailing wind is east at the surface, northeast at 1,600 and 3,300 feet and southeast above this level. The prevailing wind in autumn is north or northeast through the 6,600-foot level and northwest above that level. Northwest winds increase with altitude in all seasons.

Resultant winds.—The resultant wind shown in table 10 are computed by a method involving treatment of the total wind movement from each direction as a vector quantity. Thus, the seasonal resultant wind at any level indicates the resultant mass movement of the air at that level as it has been measured by the particular set of observations included in this summary. In most cases the resultant directions agree closely with the prevailing directions as indicated by the corresponding wind roses; the agreement in directions is closest where the winds are most constant. Resultant wind velocities are also greatest where winds are most constant, other factors being equal.

TABLE 10.—*Resultant winds*

[Directions in degrees from North (N.=360°, E.=90°, S.=180°, etc.). Velocities in knots]

	Surface		1,600 feet		3,300 feet		6,600 feet		9,800 feet		13,100 feet	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
WINTER												
Reykjavik, Iceland	110	4.5	46	4.5	161	4.5	312	0.6	330	3.1	325	10.9
Akureyri, Iceland	166	7.8	189	8.1	200	7.4	229	7.4	212	7.2	218	8.1
East Station, Greenland	67	1.7	300	8.1	303	5.8	281	4.1	238	4.1	236	6.0
Mount Evans, Greenland	111	4.7	122	7.4	152	8.1	162	12.2	169	12.0	185	9.5
Camp Scott, Greenland	[1]		300	.2	360	.2	197	1.9	199	4.7	196	8.1
MacGregor Arctic Station	60	6.2	62	8.0	45	6.4	101	2.5	156	4.5	122	7.4
SPRING												
Reykjavik, Iceland	87	6.2	98	6.8	101	6.6	76	3.5	25	4.1	346	5.0
Akureyri, Iceland	152	2.9	157	3.5	170	3.9	182	3.3	207	2.9	272	1.6
East Station, Greenland	55	1.4	293	6.8	301	7.6	236	3.3	218	6.4	218	8.7
Mount Evans, Greenland	109	3.7	124	4.7	147	5.6	179	10.1	188	14.0	192	14.0
Camp Scott, Greenland	[1]		311	1.2	309	.6	173	6.6	167	7.0	191	5.8
MacGregor Arctic Station	68	5.2	52	9.9	40	9.1	39	6.6	62	4.8	49	4.5
SUMMER												
Reykjavik, Iceland	298	1.2	225	1.0	27	1.2	9	3.7	359	6.0	350	7.4
Akureyri, Iceland	240	1.6	210	.8	203	.8	273	2.9	276	4.5	289	5.2
Adalvik, Iceland [2]	188	3.5	173	4.7	175	5.0	199	2.9	189	2.3	18	.8
Myggbukta, Greenland [3]	138	1.3	297	.5	300	1.8	292	2.6	283	3.0	300	3.0
East Station, Greenland	225	.2	328	1.2	341	7.2	345	7.4	336	6.6	336	5.4
Angmagssalik, Greenland	92	.4	76	.6	49	2.5	59	3.9	17	1.4	304	1.4
Mount Evans, Greenland	109	4.1	107	3.5	108	2.7	176	3.9	178	4.7	202	6.6
MacGregor Arctic Station [4]	97	1.6	73	5.6	68	5.6	51	4.7	38	1.7	148	3.3
	Surface		13,100 feet		16,400 feet		19,700 feet		23,000 feet		26,200 feet	
Eismitte, Greenland [4]	113	6.4	113	4.1	121	1.6	33	1.7	40	6.0	19	10.3
AUTUMN												
	Surface		1,600 feet		3,300 feet		6,600 feet		9,800 feet		13,100 feet	
Reykjavik, Iceland	67	4.1	54	3.5	65	3.7	23	4.5	1	7.2	9	8.3
Akureyri, Iceland	168	6.2	183	6.2	195	5.2	233	6.0	246	6.4	240	8.9
East Station, Greenland	73	1.9	305	10.1	298	8.9	294	3.3	305	7.0	329	7.8
Mount Evans, Greenland	102	5.2	119	6.4	157	5.6	180	7.6	165	7.6	167	7.6
Camp Scott, Greenland	[1]		146	1.6	348	.4	311	1.2	235	2.3	238	4.7
MacGregor Arctic Station	67	7.6	43	16.1	29	14.7	25	10.5	360	7.6	332	8.5

[1] No data.
[2] No data for June and July.
[3] June 18–Aug. 10, 1927.
[4] June only.
[5] May 28–Oct. 4.

Velocity frequencies.—Over Iceland, the wind velocities, as shown by the velocity of winds from all directions, increase with altitude. Velocities are highest in winter and lowest in summer. Velocities are somewhat lower at Akureyri than at Reykjavik as shown by this summary.

At Reykjavik the percentage frequency of winds between 0–3 knots at the surface, averaging about 10–15 percent in all seasons, and decreases with altitude. As is to be expected at stations where wind velocity increases with altitude, the greatest percentage of winds shift with altitude from a lower velocity group to a higher one. At Reykjavik the greatest percent shifts with altitude from the 4–14 knots group to the 15–28 knots group, except in summer when the largest percent remains in the 4–14 knots group. The percentage of winds in the 29–41 knots group also increases with altitude but does not exceed 20 percent even at higher altitudes in winter. The percent of winds over 41 knots is small in any season or level, except for 20 percent recorded at 14,100 feet in winter.

Since wind velocities at Akureyri and Adalvik follow much the same pattern as at Reykjavik, they are not discussed.

Over the east coast of Greenland, wind velocities increase with altitude at all stations. At East Station little variation in velocity was noted between seasons.

At East Station the percentage of winds 0–3 knots at the surface was large in all seasons, being greatest in summer, 96 percent, and least in autumn, 35 percent. Above the surface, the greatest percentage of winds in most cases fell into the group 4–14 knots. At the surface no winds between 15–28 knots were recorded in any season; at other levels, however, the percentage of winds in this group varied between 20 and 40 percent, generally increasing with altitude. The percentage of winds in the group 29–41 knots was small (mostly less than 8 percent) while only one instance of a wind over 41 knots was recorded (at the 13,100-foot level in winter).

Wind velocities at Angmagssalik and Myggbukta in summer were in rather close agreement with those at East Station.

At Eismitte in summer, average wind velocities increase with altitude from 13 knots at the surface to 27 knots at 26,200 feet. The percentage of winds 0–3 knots was small (5 percent at the surface and decreasing upward). At the surface and 13,100 feet the greatest percentage of winds fell into the group 4–14 knots; at 16,400 feet through 23,000 feet, into the 15–28 knots group and at 26,200 feet, into the group 41 knots and over. No winds over 41 knots were recorded below the 16,400-foot level.

On the west coast of Greenland, average velocity increased with altitude except at Etah where the maximum velocity in general occurred at about the 3,300-foot level. At Mount Evans wind velocities were highest in winter and spring and lowest in summer, while at Etah wind velocity was higher in autumn and lowest in summer.

At Mount Evans and Camp Scott the percentage of winds in the groups 0–3 knots and 4–14 knots decreased with altitude in all seasons, and the percentage of winds in the groups 15–28 knots, 29–41 knots, and over 41 knots increased with altitude during all seasons. In general, the greatest percentage of winds fell into the group 4–14 knots, except in some cases at the higher levels when the group 15–28 knots had the greatest. At Camp Scott no winds of over 41 knots were recorded.

At Etah the distribution of different velocities is slightly different from other stations, due to the fact that more higher velocities were recorded near the 3,300-foot level than at other levels. In all seasons and levels, however, the greatest percentage fell in the group 4–14 knots, while the percentage in the 15–28 knots group varied generally between 20 and 40 percent. Winds in the group 29–41 knots were few, but more numerous in autumn, while in summer no winds in the group over 41 knots were recorded.

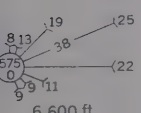
SURFACE AND UPPER AIR WIND ROSES

CHART 18.—Location of upper air stations.

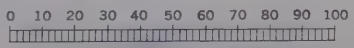
DESCRIPTION OF WIND ROSES—CHARTS 19 TO 28

Charts 19 to 28 display roses of average winds in the upper air for specific levels, indicated by heights beneath the roses. All observations were taken at the same place and time.

The arrows fly *with* the wind and their length, measured on the scale below, from the outside of the circle, gives the percentage of time the wind was observed to blow from or near the given point. The figures at the beginning of the arrows show the average speed in knots. In the center of the circle, the upper figures give the number of observations upon which the roses were constructed and the lower figures give the percentage of calms and winds of less than 1 knot. Where the percentage of frequency of the winds was less than 2 percent no arrow is shown. In some instances the full length of the arrow could not be shown and the line was, therefore, broken and the total percentage given between the broken lines.



Example.—Percentage of frequency; direction and average speed: 2 from N., with an average speed of wind from that direction of 8 knots; 2 from NNE., average speed 13 knots; 12 from NE., 19 knots; 38 from ENE., 25 knots; 27 from E., 22 knots; 7 from ESE., 11 knots; 3 from SE., 9 knots; 3 from SSE., 9 knots; 575 observations; percentage of calms 0.



SCALE OF WIND PERCENTAGES

SURFACE AND UPPER AIR WIND ROSES—Continued

CHART 19.—Adalvik, Iceland.

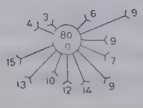
Summer (June-July)

13,100 ft.

9800 ft.

6600 ft.

3300 ft.

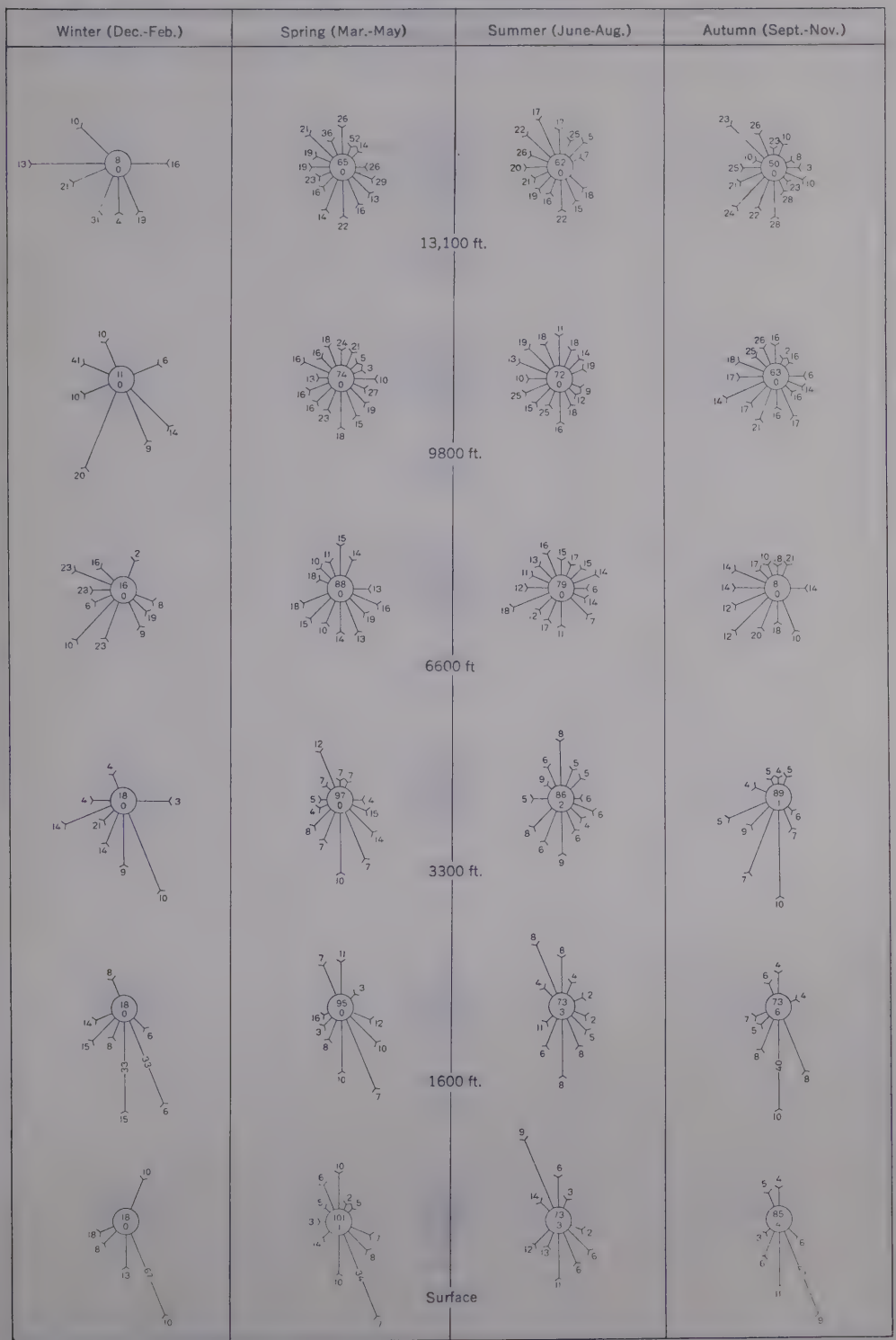


1600 ft.

Surface

SURFACE AND UPPER AIR WIND ROSES—Continued

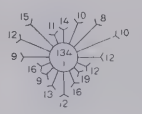
Chart 20.—Akureyri, Iceland.



SURFACE AND UPPER AIR WIND ROSES—Continued

CHART 21.—Angmagssalik, Greenland.

Summer (June-Aug.)



13,100 ft.

9800 ft.

6600 ft.

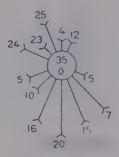
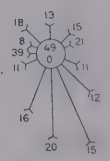
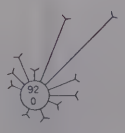
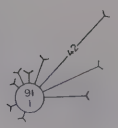
3300 ft.

1600 ft.

Surface

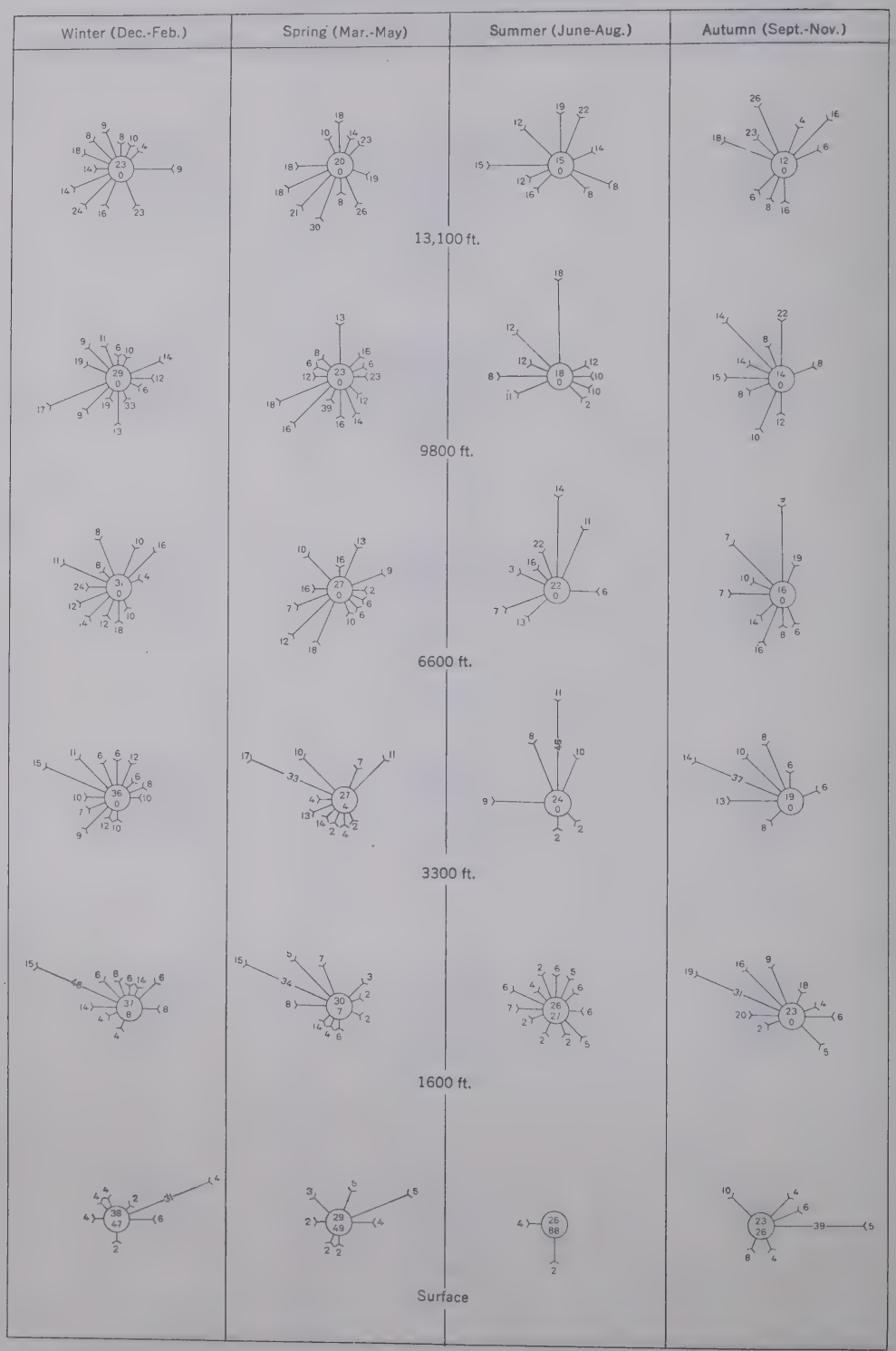
SURFACE AND UPPER AIR WIND ROSES—Continued

Chart 22.—Camp Scott, Greenland.

Winter (Dec.-Feb.)	Spring (Mar.-Apr.)	Autumn (Sept.-Nov.)
	 13,100 ft.	
	 9800 ft.	
	 6600 ft.	
	 3300 ft.	
	 1600 ft.	
	 Surface	

SURFACE AND UPPER AIR WIND ROSES—Continued

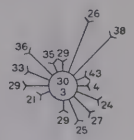
Chart 23.—East Station, Greenland.



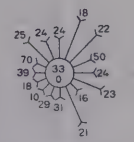
SURFACE AND UPPER AIR WIND ROSES—Continued

CHART 24.—Eismitte, Greenland.

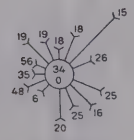
May 28 - Oct. 4



26,200 ft.

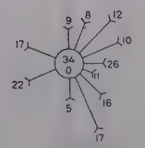


23,000 ft.

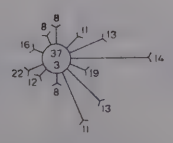


19,700 ft.

16,400 ft.



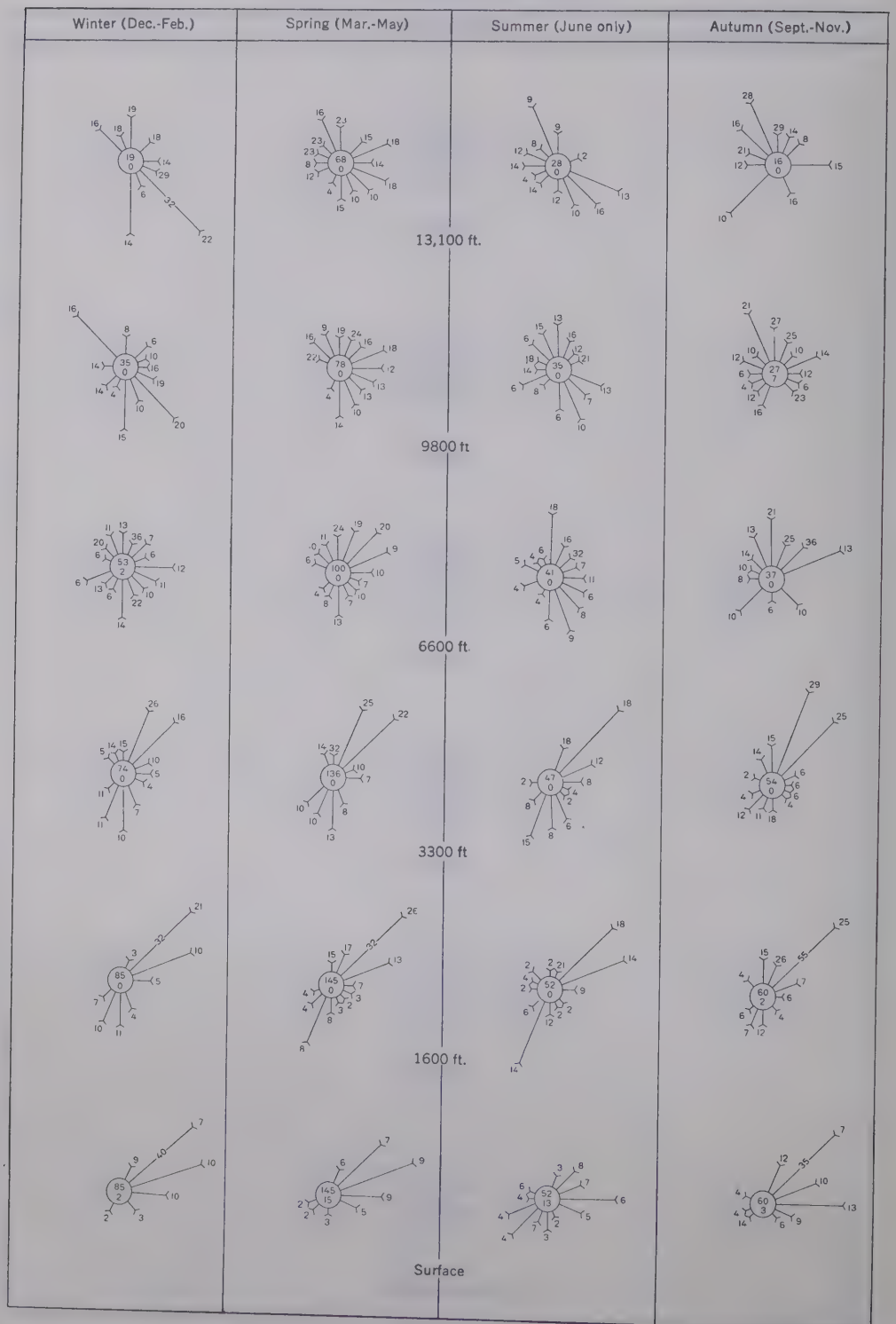
13,100 ft.



Surface (9,842 ft.)

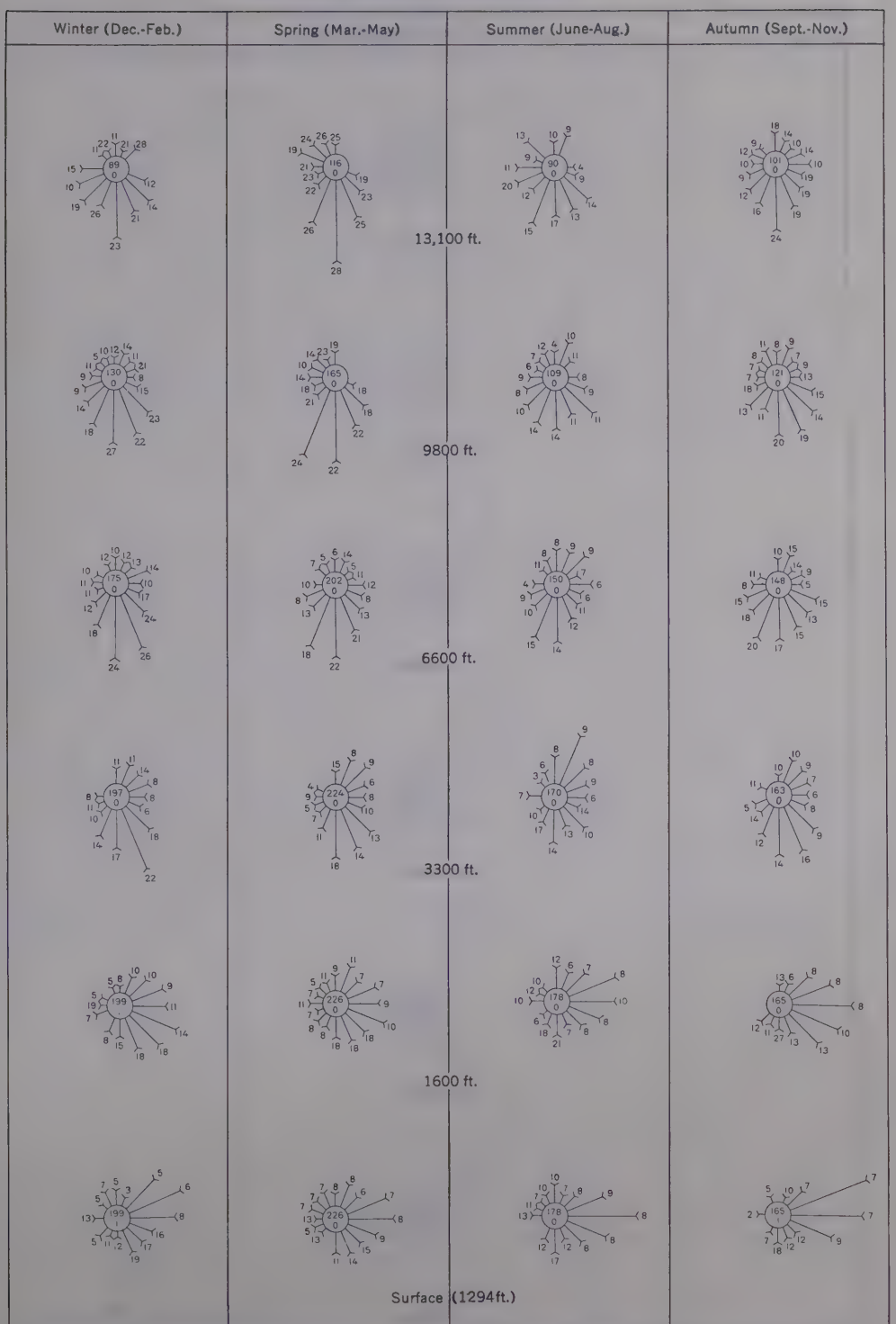
SURFACE AND UPPER AIR WIND ROSES—Continued

Chart 25.—MacGregor Expedition Station, Greenland.



SURFACE AND UPPER AIR WIND ROSES—Continued

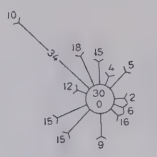
Chart 26.—Mount Evans, Greenland.



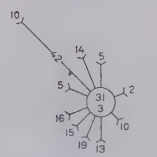
SURFACE AND UPPER AIR WIND ROSES—Continued

Chart 27.—Myggbukta, Greenland.

Summer (June 18-Aug. 10)

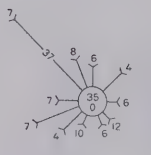


13,100 ft.

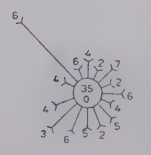


9800 ft.

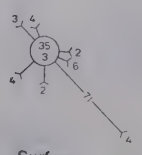
6600 ft.



3300 ft.



1600 ft.



Surface

SURFACE AND UPPER AIR WIND ROSES—Continued

Chart 28.—Reykjavik, Iceland.

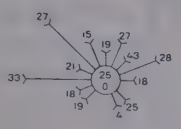
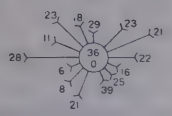
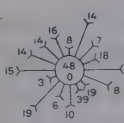
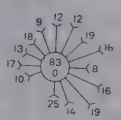
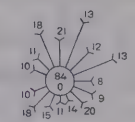
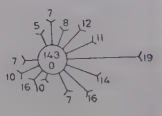
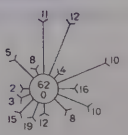
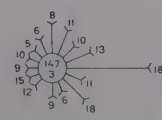
Winter (Dec.-Feb.)	Spring (Mar.-May)	Summer (June-Aug.)	Autumn (Sept.-Nov.)
			
13,100 ft.			
			
9800 ft.			
			
6600 ft.			
			
3300 ft.			
			
1600 ft.			
			
Surface			

TABLE 11.—*Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for direction*

ADALVIK, ICELAND

SUMMER (JUNE AND JULY)

	Surface (10 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Av ve it
N	1.4				1.4	3.9							1.2				1.2	
NNE													2.5				2.5	
NE	4.2				4.2	5.8	3.8				3.8	5.8	2.5	1.2			3.7	
ENE	5.7	2.8			8.5	10.1	11.3	1.2			12.5	9.1	3.7	3.7			7.4	
E	14.1				14.1	6.6	7.5				7.5	9.3	7.4	5.0			12.4	
ESE	9.9				9.9	10.3	5.0	1.3			6.3	6.8	6.2	1.2			7.4	
SE	1.4	1.4			2.8	10.7	11.3	1.2			12.5	8.7	3.7	1.2			4.9	
SSE	2.8	4.3		1.4	8.5	22.3	3.8		1.3	1.2	6.3	14.4	8.7		1.2		9.9	
S							3.7	2.5			6.2	11.6	5.0	2.5	1.2		8.7	
SSW	5.6				5.6	9.3	6.2				6.2	9.7	9.9	1.2			11.1	
SW	8.5	2.8			11.3	12.8	7.5	1.3	2.5		11.3	13.0	4.9	3.7			8.6	
WSW	1.4	4.2	1.4		7.0	21.0	2.5	7.5			10.0	15.3	1.2	5.0	1.2		7.4	
W	4.2				4.2	7.8	1.2				1.2	7.8	3.7		1.2		4.9	
WNW	1.4				1.4	3.9	2.5				2.5	3.9						
NW	7.0				7.0	10.7	1.2				1.2	2.9						
NNW	5.6				5.6	4.3							2.5				2.5	
Total, percent	73.2	15.5	1.4	1.4	91.5	9.9	67.5	15.0	3.8	1.2	87.5	10.3	63.1	24.7	4.8		92.6	
	Percent, 0–3 knots 8.5 Number of observations 71						Percent, 0–3 knots 12.5 Number of observations 80						Percent, 0–3 knots Number of observations					

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Ave vel ity
N	7.6	1.3			8.9	10.3	4.0	2.6			6.6	14.7	5.7	1.4			7.1	
NNE	2.5		1.3		3.8	14.2	4.0				4.0	7.2	1.4				1.4	
NE	2.5				2.5	6.8	2.6				2.6	7.8	1.4				1.4	
ENE	2.5	1.3			3.8	10.3	2.6				2.6	10.7	2.9				2.9	
E	3.8	3.8	1.3		8.9	16.9	5.3	3.9	1.3		10.5	17.5	1.5	5.7	1.4	1.4	10.0	
ESE	3.8	2.5			6.3	14.4	1.3	1.3	2.7		5.3	25.6	2.9	2.8		1.4	7.1	
SE	2.5	5.1			7.6	14.9		6.6			6.6	20.2	2.9	4.3		1.4	8.6	
SSE	5.1	6.3			11.4	13.8	4.0	1.3	1.3		6.6	16.7		4.3	1.4		5.7	
S		1.3	1.2		2.5	29.1		2.6			2.6	22.3	1.4		2.9		4.3	
SSW	2.5	3.8	1.3		7.6	17.1	2.7	1.3	1.3	1.3	6.6	20.4		1.5	1.4		2.9	
SW	1.3	5.0			6.3	21.7	5.3	3.9	1.3		10.5	15.9	1.5	1.4	1.4		4.3	
WSW	1.3		1.2		2.5	26.2	2.7	2.6			5.3	14.0	2.9				2.9	
W	5.1	2.5	1.3		8.9	16.3	1.3	2.7			4.0	17.5	1.5	1.4			2.9	
WNW	2.5	5.1			7.6	17.1	5.3	2.6	2.6		10.5	16.5	5.7	5.7			11.4	
NW	1.3	3.8			5.1	15.1	1.3				1.3	3.9	2.9	4.3	1.4		8.6	
NNW	2.5	1.3			3.8	9.7	5.3	5.2			10.5	14.4	1.4	14.3	1.4		17.1	
Total, percent	46.8	43.1	7.6		97.5	15.3	47.7	36.6	10.5	1.3	96.1	16.1	36.0	47.1	11.3	4.2	98.6	
	Percent 0–3 knots 2.5 Number of observations 79						Percent 0–3 knots 3.9 Number of observations 76						Percent 0–3 knots Number of observations					

LE 11.—*Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for each direction*—Continued

AKUREYRI, ICELAND

WINTER (DECEMBER–FEBRUARY)

	Surface (13 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
		5.6			5.6	9.7												
													5.6				5.6	2.9
							5.6				5.6	5.8						
	61.1	5.6			66.7	10.5	33.3				33.3	6.2	22.2	5.6			27.8	10.5
	5.6	5.5			11.1	12.6	11.1	22.2			33.3	14.9	16.7				16.7	9.1
							5.5				5.5	7.8	5.5	5.6			11.1	13.6
	5.5				5.5	7.8	5.5	5.6			11.1	14.6		5.5			5.5	21.3
		5.6			5.6	17.5	5.6				5.6	13.6	5.5	11.1			16.6	14.2
													5.6				5.6	3.9
							5.6				5.6	7.8	5.5				5.5	3.9
otal. percent	72.2	22.3			94.5	10.9	72.2	27.8			100.0	10.5	66.6	27.8			94.4	10.3
	Percent 0–3 knots 5.5 Number of observations 18						Percent 0–3 knots 0.0 Number of observations 18						Percent 0–3 knots 5.6 Number of observations 18					

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
E																		
E							9.1				9.1	5.8						
	6.2				6.2	7.8								12.5			12.5	15.5
		6.3			6.3	19.4		9.1			9.1	13.6						
	18.7				18.7	9.1	18.2				18.2	8.7		12.5			12.5	19.4
													12.5				12.5	3.9
V		6.2	6.3		12.5	23.3	9.0	18.2			27.2	20.0			12.5		12.5	31.0
	12.5	6.3			18.8	9.7												
W	6.2				6.2	5.8	8.1				9.1	9.7		12.5			12.5	21.3
		6.3			6.3	23.3							12.5	12.5			25.0	12.6
W	6.3		6.2		12.5	23.3				9.1	9.1	40.8						
		6.2			6.2	15.5							12.5				12.5	9.7
W							9.1				9.1	9.7						
otal percent	49.9	31.3	12.5		93.7	14.0	54.5	27.3		9.1	90.9	15.5	37.5	50.0	12.5		100.0	15.7
	Percent 0–3 knots 6.3 Number of observations 16						Percent 0–3 knots 9.1 Number of observations 11						Percent 0–3 knots 0.08 Number of observations					

TABLE 11.— *Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for each direction*—Continued

AKUREYRI, ICELAND

SPRING (MARCH–MAY)

	Surface (13 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N	5.9	3.0			8.9	10.3	3.2	3.1			6.3	10.7	2.1				2.1	6.
NNE							1.1				1.1	9.7	2.0				2.0	6.
NE	1.0				1.0	4.8	1.0				1.0	2.9	1.0				1.0	3.
ENE	1.0				1.0	7.8	1.1				1.1	7.8						
E													1.0				1.0	3.
ESE	5.9				5.9	7.0	5.2	1.1			6.3	12.0	3.1	2.1			5.2	14.
SE	7.9				7.9	8.0	9.5	2.1			11.6	9.5	7.2	3.1	1.0		11.3	13.
SSE	30.7				30.7	6.6	20.0	2.1			22.1	7.2	12.4	1.0			13.4	7.
S	10.9	2.0			12.9	10.1	10.5	5.3			15.8	10.1	15.5	4.1			19.6	9.
SSW							5.3				5.3	8.3	9.3	1.0			10.3	7.
SW	1.0	2.0			3.0	14.2	2.1				2.1	2.9	6.2	1.0			7.2	8.
WSW	1.0				1.0	3.9	1.0	1.1			2.1	15.5	3.1				3.1	4.
W	1.0				1.0	2.9							2.1				2.1	4.
WNW							1.0				1.0	3.9	1.0				1.0	11.
NW	2.0				2.0	4.8							1.1				1.1	6.
NNW	6.9	1.0			7.9	6.2	7.4	1.0			8.4	7.0	7.2	2.1	1.0		10.3	12.
Total, percent	75.2	8.0			83.2	7.4	68.4	15.8			84.2	8.5	74.3	14.4	2.0		90.7	9.
	Percent 0–3 knots 16.8 Number of observations 101						Percent 0–3 knots 15.8 Number of observations 95						Percent 0–3 knots 9. Number of observations 97					

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N	4.5	5.7			10.2	15.3		5.4			5.4	23.7	1.5	3.1	4.6		9.2	26.2
NNE	2.3	3.4			5.7	14.0	1.3	2.7	1.4		5.4	21.0		1.5		1.6	3.1	52.5
NE							1.3				1.3	4.8	1.5	1.6			3.1	13.6
ENE	1.1				1.1	3.9	1.4				1.4	2.9						
E	2.3	2.3			4.6	12.6	2.7	1.4	1.3		5.4	10.5		1.5	1.6		3.1	26.2
ESE	3.4	5.7			9.1	16.5		2.7	1.4		4.1	27.2	1.6		3.1	1.5	6.2	28.7
SE		4.6	1.1		5.7	19.4	1.4	4.1	1.3		6.8	19.4	4.6	3.1			7.7	12.8
SSE	8.0	3.4			11.4	13.0		5.4	1.3		6.7	14.9	4.6	4.6			9.2	15.5
S	4.6	4.5			9.1	14.2	1.4	10.8			12.2	17.7		12.3			12.3	21.5
SSW	4.5	2.3			6.8	9.9	2.7	1.3	1.4	1.4	6.8	22.9	4.6	6.2			10.8	14.2
SW	4.5	5.7			10.2	14.7	2.7	4.0			6.7	16.3	1.5	3.1			4.6	16.1
WSW	5.7	1.1	2.3		9.1	17.5	2.7	4.1			6.8	15.5		4.6			4.6	22.8
W	1.1				1.1	9.7	1.4	1.3			2.7	12.6		6.1			6.1	19.0
WNW	1.1	2.3			3.4	17.5	1.3	2.7	5.4		9.4	15.7		1.6	1.5		3.1	18.8
NW	1.1	2.3			3.4	10.5	2.7	2.7			5.4	16.5	3.1	6.2	1.5		10.8	21.1
NNW	2.3		1.1		3.4	11.3	2.7	4.1			6.8	17.5			3.1	1.5	4.6	36.3
Total, percent	46.5	43.3	4.5		94.3	14.4	25.7	52.7	13.5	1.4	93.3	16.9	23.0	55.5	15.4	4.6	98.5	21.3
	Percent 0–3 knots 5.7 Number of observations 88						Percent 0–3 knots 6.7 Number of observations 74						Percent 0.3 knots 1.5 Number of observations 65					

TABLE 11.—*Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for each direction*—Continued

AKUREYRI, ICELAND

SUMMER (JUNE–AUGUST)

	Surface (13 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N	8.2	1.4			9.6	5.8	8.2	2.7			10.9	8.5	11.6	2.3			13.9	7.8
NNE	1.4				1.4	2.9	2.7				2.7	3.9	4.6				4.6	5.0
NE													1.2				1.2	4.8
ENE													1.2				1.2	3.9
E	1.4				1.4	3.9	1.4				1.4	3.9	2.3				2.3	5.8
ESE							1.4				1.4	2.5	7.0				7.0	6.2
SE	9.6				9.6	5.8	6.8				6.8	5.4	2.3				2.3	3.5
SSE	8.2				8.2	5.6	9.6				9.6	7.6	5.8				5.8	6.2
S	12.3	2.8			15.1	10.7	15.1	2.7			17.8	8.0	14.0				14.0	9.1
SSW	4.1	1.4			5.5	12.6	9.6				9.6	5.8	8.1	1.2			9.3	6.0
SW	5.5		1.3		6.8	11.6		1.4			1.4	10.7	9.3				9.3	7.6
WSW							1.4				1.4	5.8	1.2				1.2	5.8
W							1.4				1.4	3.9	3.5				3.5	4.8
WNW													1.2				1.2	13.6
NW	1.4	2.7			4.1	13.6	2.7				2.7	3.9		1.1			1.1	8.7
NNW	21.8	1.4			23.2	8.9	15.1				15.1	7.6	7.0				7.0	6.2
Total, percent	73.9	9.7	1.3		84.9	8.0	75.4	6.8			82.2	6.6	80.3	4.6			84.9	6.6
	Percent 0–3 knots					15.1	Percent 0–3 knots					17.8	Percent 0–3 knots					15.1
	Number of observations					73	Number of observations					73	Number of observations					86

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N	2.5	2.6			5.1	14.6	8.3	1.4			9.7	10.9	3.2	4.9			8.1	17.1
NNE	2.5		1.3		3.8	16.9	2.8	1.4	1.4		5.6	17.8		3.2	1.6		4.8	25.2
NE	2.6	2.5			5.1	15.1	2.7	2.8			5.5	13.6	1.6	4.8			6.4	15.1
ENE	3.8	3.8			7.6	14.0	1.4	1.4	1.4		4.2	19.4	1.6				1.6	6.8
E	3.8				3.8	6.4												
ESE		2.5			2.5	14.2	2.8				2.8	8.7						
SE	5.1				5.1	6.8	2.8				2.8	11.6	1.6	4.9			6.5	18.4
SSE	1.3				1.3	11.6	1.4	4.2			5.6	17.5	4.9	1.6	1.6		8.1	15.1
S	6.3	1.3			7.6	10.7	4.2	4.1	1.4		9.7	15.7	4.9	1.6	3.2		9.7	21.7
SSW	2.5	3.8	1.3		7.6	17.1	1.4	1.4	2.8		5.6	25.2	3.2	1.6			4.8	16.1
SW	5.1	1.2			6.3	11.6	5.6		1.3		6.9	14.7	1.6	3.2	1.6		6.4	19.4
WSW	5.0	5.1	2.5		12.6	18.2	1.4	4.1	2.8		8.3	25.2	3.2		1.6		4.8	20.8
W	6.3	1.3			7.6	12.0	4.2				4.2	10.1	3.3	1.6	1.6		6.5	20.4
WNW	5.1	1.2			6.3	10.9	6.9	2.8			9.7	13.4		4.9	1.6		6.5	25.6
NW	3.8	2.5			6.3	13.2	5.5	1.4	1.4	1.4	9.7	19.4	1.6	6.5	1.6	1.6	11.3	22.1
NNW	3.8	3.8			7.6	16.5	2.8	4.1	1.4		8.3	17.8	4.8	8.1			12.9	17.3
Total, percent	59.5	31.6	5.1		96.2	13.4	54.2	29.1	13.9	1.4	98.6	16.5	35.5	46.9	14.4	1.6	98.4	19.0
	Percent 0–3 knots					3.8	Percent 0–3 knots					1.4	Percent 0–3 knots					1.6
	Number of observations					79	Number of observations					72	Number of observations					62

TABLE 11.—*Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for each direction*—Continued

AKUREYRI, ICELAND

AUTUMN (SEPTEMBER–NOVEMBER)

	Surface (13 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N	3.5				3.5	3.9	5.5				5.5	4.3	2.2				2.2	3.9
NNE													3.4				3.4	5.2
NE													1.1				1.1	7.8
ENE	1.2				1.2	3.9	1.4				1.4	3.9						
E													1.1				1.1	13.6
ESE	1.2				1.2	5.8							1.1				1.1	7.8
SE	2.4				2.4	6.4							2.3				2.3	5.8
SSE	43.5	2.3			45.8	8.9	15.0	1.4			16.4	8.5	6.8				6.8	6.8
S	12.9	2.4	1.2		16.5	11.4	31.5	2.7	1.4		35.6	10.1	24.7	3.4	1.1		29.2	9.7
SSW	5.9				5.9	6.0	8.2	1.4			9.6	8.1	16.9	1.1			18.0	6.8
SW	1.2				1.2	2.9	2.7				2.7	5.2	6.8	2.2			9.0	8.7
WSW	1.1				1.1	11.6	4.1				4.1	7.2	11.2				11.2	5.4
W							1.4				1.4	13.6						
WNW	1.2				1.2	3.9							3.4				3.4	3.9
NW	1.2				1.2	3.9												
NNW	3.5				3.5	5.4	4.1				4.1	5.8	1.1				1.1	4.8
Total percent	78.8	4.7	1.2		84.7	7.8	73.9	5.5	1.4		80.8	8.0	82.1	6.7	1.1		89.9	7.4
	Percent 0–3 knots 15.3 Number of observations 85						Percent 0–3 knots 19.2 Number of observations 73						Percent 0–3 knots 10.1 Number of observations 89					

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N		2.5			2.5	17.5	1.6	4.7			6.3	15.9		2.0			2.0	23.3
NNE		1.3	1.2		2.5	21.3	1.6				1.6	11.6	4.0				4.0	9.7
NE	1.2				1.2	13.6		1.6			1.6	15.5						
ENE	1.2				1.2	7.8							2.0				2.0	7.8
E	3.7	1.2			4.9	13.6	3.2				3.2	5.8	4.0				4.0	12.6
ESE	1.2				1.2	7.8	3.2	1.6			4.8	14.2	6.0				6.0	10.3
SE		1.2			1.2	19.4	1.6	1.6			3.2	15.5		2.0			2.0	23.3
SSE	11.1				11.1	10.1	3.2	4.7	1.6		9.5	16.9		2.0	2.0		4.0	28.1
S	2.5	4.9			7.4	18.4	1.5	4.8			6.3	16.5		6.0	6.0		12.0	28.1
SSW	3.7	5.0	1.2		9.9	19.6	1.6	7.9	1.6		11.1	20.6		8.0	2.0		10.0	22.5
SW	9.9	6.2			16.1	12.2	3.1	3.2	1.6		7.9	17.1	4.0	8.0		2.0	14.0	23.9
WSW	6.2	2.5	1.2		9.9	12.2	9.5	4.8			14.3	13.6	2.0	6.0			8.0	21.0
W	7.4	2.5			9.9	13.6	1.6	6.3			7.9	16.7		4.0	2.0		6.0	25.2
WNW	6.2	4.9			11.1	13.8	4.7	3.2	1.6		9.5	17.8	2.0				2.0	9.7
NW	2.5		1.2		3.7	16.9		3.2	1.6		4.8	24.6	6.0	2.0	8.0		16.0	23.3
NNW	3.7				3.7	9.7	1.6	3.2	1.6		6.4	25.6		6.0	2.0		8.0	25.6
Total, percent	60.5	32.2	4.8		97.5	14.2	38.0	50.8	9.6		98.4	16.7	30.0	46.0	22.0	2.0	100.0	21.9
	Percent 0–3 knots 2.5 Number of observations 81						Percent 0–3 knots 1.6 Number of observations 63						Percent 0–3 knots 0.0 Number of observations 50					

TABLE 11.—*Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for each direction*—Continued

ANGMAGSSALIK, GREENLAND

SUMMER (JUNE–AUGUST)

	Surface (106 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N	1.2				1.2	3.5	4.5				4.5	4.1	3.7				3.7	5.2
NNE	1.2				1.2	5.4	1.6				1.6	3.7	2.5				2.5	5.8
NE	1.2				1.2	6.2	1.2	0.4			1.6	5.0	8.2	0.4			8.6	7.2
ENE	.8				.8	5.0	4.9	.4			5.3	6.2	14.0	4.1	0.4		18.5	10.9
E	2.5				2.5	4.8	3.7				3.7	4.3	7.0	.4			7.4	7.0
ESE	1.7	0.4			2.1	5.6	6.6				6.6	6.2	2.9	.4			3.3	5.4
SE	2.1				2.1	4.3	6.1				6.1	4.3	1.2				1.2	3.9
SSE	2.9				2.9	4.5	2.5				2.5	3.5	1.2				1.2	3.1
S	1.2				1.2	4.8	2.5				2.5	3.7	.4				.4	2.9
SSW							2.1				2.1	5.4	1.2	.4			1.6	7.8
SW							.8				.8	3.5	2.1				2.1	3.7
WSW	.8				.8	5.2	3.7				3.7	4.5	3.3				3.3	4.7
W	1.7				1.7	3.3	3.3				3.3	4.1	8.7				8.7	6.8
WNW	.8				.8	2.9	3.3				3.3	4.3	5.8				5.8	4.3
NW	.8				.8	2.5	4.1				4.1	4.7	2.1				2.1	4.7
NNW	1.6				1.6	4.3	3.7				3.7	5.6	3.7	.8			4.5	7.8
Total, percent	20.5	.4			20.9	1.6	54.6	.8			55.4	3.3	68.0	6.5	.4		74.9	6.2
Percent 0–3 knots						79.1						44.6						25.1
Number of observations						244						244						243

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N	1.6	0.5			2.1	11.3	3.8				3.8	7.0	3.7	0.8			4.5	14.2
NNE	4.2	1.0			5.2	9.3	3.1				3.1	8.1	3.0	2.2			5.2	9.5
NE	7.3	3.1			10.4	10.5	7.5	4.4			11.9	13.8	8.9	.7			9.6	8.5
ENE	10.4	9.4	2.6	0.5	22.9	16.1	10.1	2.5			12.6	10.5	11.9	1.5			13.4	9.5
E	3.6	1.1	.5		5.2	12.4	4.4	1.3			5.7	9.9	4.5	2.2			6.7	13.4
ESE	3.1				3.1	6.4	1.9				1.9	6.8	1.5	1.5			3.0	11.6
SE	1.6				1.6	5.8	1.9	1.3			3.2	9.7	.7		0.8		1.5	19.4
SSE	3.6				3.6	7.6	.6				.6	5.8	1.5	2.2			3.7	15.5
S	2.1				2.1	8.1	7.5	1.3			8.8	10.1	5.2	1.5			6.7	12.2
SSW	3.1				3.1	7.2	1.9	.6			2.5	7.8	1.5	3.0			4.5	13.4
SW	2.6	2.6			5.2	14.6	3.8	2.5			6.3	12.4	3.0				3.0	9.3
WSW	3.6	2.1			5.7	9.5	5.1	.6			5.7	10.3	1.5	.8	.7		3.0	16.5
W	8.9				8.9	8.5	4.4	1.3			5.7	9.5	6.7	.8			7.5	9.1
WNW	2.1				2.1	4.3	7.5	1.9			9.4	9.9	6.0	3.0			9.0	12.4
NW	4.2	.5			4.7	8.1	4.4	1.9			6.3	11.8	4.5	4.5			9.0	14.6
NNW	2.1				2.1	4.5	2.5				2.5	10.7	2.3	.7			3.0	11.3
Total, percent	64.1	20.3	3.1	.5	88.0	10.5	70.4	19.6			90.0	9.9	66.4	25.4	1.5		93.3	11.4
Percent 0–3 knots						12.0						10.0						6.7
Number of observations						192						159						134

TABLE 11.— *Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for each direction*—Continued

CAMP SCOTT, GREENLAND

WINTER (DECEMBER–FEBRUARY)

	Surface (10 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N							3.6				3.6	5.8	6.0	4.0			10.0	12.4
NNE							3.6				3.6	8.7	6.0				6.0	7.2
NE							8.9				8.9	3.5	6.0				6.0	5.8
ENE													2.0				2.0	3.9
E							5.4				5.4	3.9	2.0				2.0	3.9
ESE							5.4	1.7			7.1	9.7	4.0				4.0	5.8
SE							3.6				3.6	9.7	4.0	2.0			6.0	8.1
SSE							7.1				7.1	5.0	6.0	2.0			8.0	10.1
S							10.7				10.7	5.6	8.0				8.0	5.2
SSW							3.5				3.5	5.8	4.0	2.0			6.0	10.3
SW													8.0				8.0	6.8
WSW													2.0				2.0	3.9
W							7.1				7.1	6.8						
WNW							5.4				5.4	8.3						
NW							12.5	1.8			14.3	7.4	10.0				10.0	6.6
NNW							5.4				5.4	4.5	8.0	2.0			10.0	10.1
Total percent							82.2	3.5			85.7	6.2	76.0	12.0			88.0	7.8
							Percent 0–3 knots 14.3 Number of observations 56						Percent 0–3 knots 12.0 Number of observations 50					

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N	2.8				2.8	11.6												
NNE		2.8			2.8	15.5			3.8		3.8	31.0						
NE	2.8				2.8	11.6												
ENE																		
E																		
ESE	11.1				11.1	7.4	7.7				7.7	7.8						
SE	11.1				11.1	7.4		3.8			3.8	15.5			6.7		6.7	36.9
SSE	11.1	5.5			16.6	14.6	7.7	3.8	3.9		15.4	20.4	13.3	6.7			20.0	14.2
S	5.5	2.8	2.8		11.1	18.4	3.8				3.8	7.8		13.3			13.3	17.5
SSW	2.8				2.8	3.9	3.9	11.5			15.4	19.4	6.7		6.7		13.4	24.2
SW	5.6				5.6	6.8	3.8	3.9			7.7	8.1	13.3	6.7			20.0	10.3
WSW	2.8				2.8	3.9	3.9				3.9	11.6						
W																		
WNW	5.5		2.8		8.3	18.8												
NW	5.5	2.8			8.3	11.1	11.5	3.9			15.4	11.6	6.6	6.7			13.3	17.5
NNW		8.3			8.3	14.6	3.9	3.8			7.7	12.6	6.7	6.6			13.3	13.6
Total percent	66.6	22.2	5.6		94.4	12.0	46.2	30.7	7.7		84.6	13.4	46.6	40.0	13.4		100.0	17.1
	Percent 0–3 knots 5.6 Number of observations 36						Percent 0–3 knots 15.4 Number of observations 26						Percent 0–3 knots 0.0 Number of observations 15					

BLE 11.—*Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for each direction*—Continued

CAMP SCOTT, GREENLAND

SPRING (MARCH AND APRIL ONLY)

	Surface (10 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
							4.3				4.3	4.3	8.2	1.2			9.4	8.7
E							3.3				3.3	2.7	9.4				9.4	6.8
							3.2				3.2	3.9	2.3				2.3	6.8
E							2.2				2.2	3.9	2.4				2.4	5.2
							1.1				1.1	3.9						
							2.2				2.2	3.9	3.5				3.5	4.3
							2.2				2.2	7.8	3.5				3.5	7.2
							4.4				4.4	3.5	8.2	1.2			9.4	7.6
							8.7				8.7	5.4	9.4				9.4	8.9
V							5.4				5.4	4.1	8.3				8.3	6.8
							4.3				4.3	3.9	3.5	1.2			4.7	5.8
W							1.1				1.1	2.9	1.2				1.2	13.6
							1.1				1.1	3.5						
W							2.2				2.2	5.2	2.4				2.4	7.8
							11.9				11.9	6.2	4.7				4.7	5.8
W							9.8				9.8	6.2	8.2	1.2			9.4	7.8
otal, percent							67.4				67.4	4.7	75.2	4.8			80.0	7.0
							Percent 0–3 knots 32.6 Number of observations 92						Percent 0–3 knots 20.0 Number of observations 85					

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
	2.9	1.5			4.4	14.2	4.1				4.1	12.6	2.9				2.9	3.9
E	2.9	1.5			4.4	11.6									2.8		2.8	11.6
	2.9				2.9	11.6	2.0	2.1			4.1	14.6						
E								2.0			2.0	21.3						
	2.9				2.9	11.6												
E	4.4				4.4	7.8	2.1	2.0			4.1	10.7		2.9			2.9	5.2
	5.9	1.5			7.4	11.6	10.2	2.1			12.3	12.0	2.8	8.6	2.9		14.3	7.0
	10.3	8.8			19.1	12.6	12.2	10.2	2.1		24.5	15.1	8.6	5.7			14.3	15.1
	8.8	7.4	4.4		20.6	17.7	8.2	6.1	6.1		20.4	19.8	2.9	11.4	2.8		17.1	20.4
V	5.9	4.4			10.3	13.6	4.1	10.2			14.3	16.1	8.6	2.8	2.9		14.3	15.9
	5.9	1.5			7.4	10.9							2.8	2.9			5.7	9.7
W	4.4				4.4	3.9	2.0	2.1			4.1	10.7	5.7				5.7	4.8
									2.0		2.0	38.8						
W	1.5				1.5	3.9	2.0				2.0	7.8		8.6			8.6	23.9
	4.4				4.4	9.1	2.0	4.1			6.1	17.5		2.8			2.8	23.3
W	4.4				4.4	7.8							2.9	2.9	2.8		8.6	25.2
otal, percent	67.5	26.6	4.4		98.	12.4	48.9	40.9	10.2		100.0	15.9	37.2	48.6	14.2		100.0	18.2
	Percent 0–3 knots 1.5 Number of observations 68						Percent 0–3 knots 0.0 Number of observations 49						Percent 0–3 knots 0.0 Number of observations 35					

TABLE 11.—*Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for each direction*—Continued

CAMP SCOTT, GREENLAND

AUTUMN (SEPTEMBER–NOVEMBER)

	Surface (10 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N							2.3				2.3	3.3	1.2				1.2	4.0
NNE							4.5				4.5	3.9	6.0				6.0	5.4
NE													2.4				2.4	4.0
ENE							2.3				2.3	3.3	3.6				3.6	5.2
E							2.2				2.2	3.9	1.2				1.2	3.0
ESE							6.8				6.8	6.0	6.0				6.0	6.2
SE							10.2				10.2	4.1	9.7	1.2			10.9	8.0
SSE							19.4				19.4	6.0	6.1				6.1	8.1
S							5.7				5.7	7.0	4.8	1.2			6.0	7.4
SSW							3.4				3.4	3.5	7.2				7.2	6.6
SW							1.1				1.1	3.9	2.4				2.4	2.0
WSW							3.4				3.4	3.9	2.4				2.4	4.0
W							1.1				1.1	9.7	1.2				1.2	5.0
WNW							3.4				3.4	5.8	2.4				2.4	4.5
NW							3.4				3.4	7.2	3.6	1.2			4.8	8.7
NNW							8.0				8.0	5.2	15.7	6.0			21.7	8.3
Total, percent							77.2				77.2	5.0	75.9	9.6			85.5	6.8
							Percent 0–3 knots					22.8	Percent 0–3 knots					14.5
							Number of observations					88	Number of observations					83

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N	8.2	4.1			12.3	12.4	5.1	3.4			8.5	15.9	2.1	2.1			4.2	13.6
NNE	1.4	1.3			2.7	7.8	1.7				1.7	7.8	4.2		2.1		6.3	13.0
NE	1.3	1.4			2.7	12.6	3.4	1.7			5.1	11.6		2.1			2.1	17.5
ENE	2.8				2.8	6.8												
E	2.7				2.7	4.8												
ESE	2.8				2.8	6.8	1.7				1.7	11.6		2.1			2.1	17.5
SE	1.4				1.4	3.9	8.4	3.4			11.8	10.7	6.2	2.1			8.3	13.2
SSE	5.5	2.7			8.2	9.5	5.1	1.7			6.8	12.0	4.2	4.1			8.3	15.5
S	8.2	4.1			12.3	10.9	8.5	1.7			10.2	10.7	4.1				4.1	10.7
SSW	2.7	1.4			4.1	7.4	8.5	1.7			10.2	11.1	8.3	2.1			10.4	11.6
SW	6.9				6.9	6.6	1.7	3.4			5.1	15.5	4.2	6.2			10.4	17.1
WSW	4.1				4.1	5.8	6.8				6.8	8.1	2.1	10.4			12.5	18.8
W							8.4				8.4	7.0	6.3				6.3	5.8
WNW	5.5				5.5	5.8	5.1	3.4			8.5	12.4	8.3				8.3	6.8
NW	6.9	1.3			8.2	8.9	1.7	3.4			5.1	14.2	4.2	6.2			10.4	14.0
NNW	5.5	4.1			9.6	10.9	5.1	1.7			6.8	10.1		2.1			2.1	15.5
Total percent	65.9	20.4			86.3	8.7	71.2	25.5			96.7	11.3	54.2	39.5	2.1		95.8	13.4
	Percent 0–3 knots					13.7	Percent 0–3 knots					3.3	Percent 0–3 knots					4.2
	Number of observations					73	Number of observations					59	Number of observations					48

e 11.—*Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for each direction*—Continued

EAST STATION, GREENLAND

WINTER (DECEMBER–FEBRUARY)

	Surface (5 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
							2.7				2.7	5.8	8.3				8.3	6.4
							2.7				2.7	13.6	5.5	2.8			8.3	11.6
							8.1				8.1	6.4	2.8				2.8	5.8
													5.5				5.5	7.8
	26.2				26.2	4.5							2.8				2.8	9.7
	7.9				7.9	5.8	5.4				5.4	7.8						
													2.8				2.8	9.7
													2.8				2.8	11.6
							2.7				2.7	3.9	11.1				11.1	8.7
													2.8				2.8	6.8
							2.7				2.7	3.9	5.6				5.6	9.7
	2.7				2.7	3.9	5.4	2.7			8.1	13.6	11.1	11.1			22.2	15.1
							16.3	24.3	2.7		43.3	14.7	11.1	2.8			13.9	11.3
	2.6				2.6	3.9	8.1				8.1	5.8	8.3				8.3	6.4
	2.6				2.6	3.9	5.4				5.4	7.8						
al, percent	42.0				42.0	2.3	59.5	27.0	2.7		89.2	10.5	80.5	16.7			97.2	10.3
	Percent 0–3 knots					58.0	Percent 0–3 knots					10.8	Percent 0–3 knots					2.8
	Number of observations					38	Number of observations					37	Number of observations					36

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
							3.4				3.4	5.8	4.3				4.3	7.8
							3.4				3.4	9.7	4.4				4.4	9.7
	6.5	3.2			9.7	10.3							4.4				4.4	3.9
	6.5	3.2	3.2		12.9	15.9					10.4	13.6						
	3.2				3.2	3.9	3.5	6.9			6.9	11.6	13.0				13.0	8.8
							6.9				3.4	5.8						
							3.4											
	3.2				3.2	9.7			3.4		3.4	33.0	4.4		4.3		8.7	23.3
	3.2				6.5	18.4	10.4				10.4	13.0						
	3.3	3.2			6.5	11.6		3.4			3.4	19.4		8.7			8.7	15.5
	3.3	3.2			9.7	13.6	6.9	3.5			10.4	9.1	4.4	4.3		4.3	13.0	23.9
	6.5	3.2			9.7	11.6	10.4	6.9	3.4		20.7	16.9	8.7	4.3			13.0	13.6
	6.5	3.2			6.4	24.2							4.4				4.4	13.6
	3.2		3.2		16.1	11.3	3.5	3.4			6.9	19.4	4.4	4.3			8.7	18.4
	9.7	6.4			3.2	7.8	10.4				10.4	9.1	8.7				8.7	7.8
	3.2				12.9	8.1	3.5	3.4			6.9	10.7	8.7				8.7	8.7
	12.9																	
otal, percent	68.0	25.6	6.4		100.0	12.6	65.7	27.5	6.8		100.0	13.6	69.8	21.6	4.3	4.3	100.0	14.0
	Percent 0–3 knots					0.0	Percent 0–3 knots					0.0	Percent 0–3 knots					0.0
	Number of observations					31	Number of observations					29	Number of observations					23

TABLE 11.—*Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for each direction*—Continued

EAST STATION, GREENLAND

SPRING (MARCH–MAY)

	Surface (5 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	
N																		
NNE	3.4				3.4	4.8												
NE							3.3				3.3	2.9	7.4				7.4	
ENE	17.3				17.3	4.8							11.1	3.7			14.8	
E	3.4				3.4	3.9												
ESE																		
SE																		
SSE																		
S																		
SSW							3.3				3.3	5.8	3.7				3.7	
SW							3.3				3.3	3.9						
WSW							3.3				3.3	13.6	3.7				3.7	
W													7.4				7.4	
WNW							10.0				10.0	7.8	3.7				3.7	
NW	3.4				3.4	2.9	20.0	13.4			33.4	14.7	7.4	22.3	3.7		33.4	
NNW							13.4				13.4	4.7	11.1	3.7			14.8	
Total, percent	27.5				27.5	1.9	10.0				10.0	7.2						
							66.6	13.4			80.0	8.3	55.5	29.7	3.7		88.9	
Percent 0–3 knots	72.5						Percent 0–3 knots	20.0					Percent 0–3 knots					
Number of observations	29						Number of observations	30					Number of observations					

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Av ve if
N		3.7			3.7	15.5	8.7	4.3			13.0	13.0	5.0	5.0			10.0	
NNE	3.7	7.4			11.1	13.0							5.0				5.0	
NE								4.3			4.3	15.5		5.0			5.0	
ENE	11.1				11.1	9.1	4.3				4.3	5.8						
E								4.3			4.3	23.3						
ESE	3.7				3.7	5.8								5.0			5.0	
SE	3.7				3.7	5.8	4.3				4.3	11.6						
SSE	3.7				3.7	9.7	4.4	4.3			8.7	13.6		5.0	5.0		10.0	
S							4.4	4.3			8.7	16.5	5.0				5.0	
SSW	3.7	7.4	3.7		14.8	17.8			4.4		4.4	38.9		5.0	10.0		15.0	
SW	11.2	7.4			18.6	12.0	4.4	13.0			17.4	16.5	5.0	15.0			15.0	
WSW	7.4				7.4	7.2	4.4	13.0			17.4	17.5	5.0	10.0			15.0	
W		3.7			3.7	15.5	4.4				4.4	11.6	5.0	5.0			10.0	
WNW							4.4				4.4	5.8						
NW	7.4	3.7			11.1	10.3	4.4				4.4	7.8						
NNW													5.0				5.0	
Total, percent	55.6	33.3	3.7		92.6	11.3	48.1	47.5	4.4		100.0	15.5	30.0	55.0	15.0		100.0	
Percent 0–3 knots	7.4						Percent 0–3 knots	0.0					Percent 0–3 knots					
Number of observations	27						Number of observations	23					Number of observations					

BLE 11.—*Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for each direction*—Continued

EAST STATION, GREENLAND

SUMMER (JUNE–AUGUST)

	Surface (5 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
							3.9				3.9	5.8	37.5	8.3			45.8	10.7
E							7.7				7.7	4.8	12.5				12.5	10.3
E							3.8				3.8	5.8						
							3.8				3.8	5.8						
							7.7				7.7	4.8	4.2				4.2	1.9
													4.2				4.2	1.9
W	3.8				3.8	3.9	7.7				7.7	6.8	12.5	4.1			16.6	8.7
W							11.6				11.6	6.4						
W							3.8				3.8	3.9						
													8.3	4.2			12.5	7.8
otal, percent	3.8				3.8	.4	50.0				50.0	3.5	79.2	16.6			95.8	9.7
	Percent 0–3 knots					96.2	Percent 0–3 knots					50.0	Percent 0–3 knots					4.2
	Number of observations					26	Number of observations					26	Number of observations					24

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
	13.7	13.6			27.3	14.2	5.6	22.2			27.8	17.8	6.7	6.6			13.3	19.4
NE	18.2				18.2	11.3								6.7	6.6		13.3	22.3
							5.5				5.5	11.6	6.7				6.7	13.6
E	9.1				9.1	5.8	5.5				5.5	9.7						
							5.6				5.6	9.7	13.3				13.3	7.8
E													6.7				6.7	7.8
E																		
W														6.7			6.7	15.5
	4.6	4.5			9.1	12.6											6.7	11.6
SW	13.6				13.6	7.2	11.1				11.1	10.7	6.7	13.3			20.0	14.9
							16.7				16.7	8.3						
NW	4.5				4.5	2.9	5.6				5.6	11.6						
W		4.5			4.5	15.5	5.6	5.5			11.1	11.6	13.3				13.3	11.6
NW		9.1			9.1	22.3												
Total, percent	63.7	31.7			95.4	11.6	61.2	27.7			88.9	12.0	60.1	33.3	6.6		100.0	14.4
	Percent 0–3 knots					4.6	Percent 0–3 knots					11.1	Percent 0–3 knots					0.0
	Number of observations					22	Number of observations					18	Number of observations					15

TABLE 11.—*Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for eac direction*—Continued

EAST STATION, GREENLAND

AUTUMN (SEPTEMBER–NOVEMBER)

	Surface (5 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N													5.2				5.2	5.
NNE								4.3			4.3	17.5						
NE	8.7				8.7	3.9							5.2				5.2	5.
ENE	8.7				8.7	5.8	4.4				4.4	3.9						
E	30.4				30.4	4.7	4.4				4.4	5.8						
ESE																		
SE							8.7				8.7	4.8						
SSE	4.3				4.3	3.9												
S																		
SSW	4.4				4.4	7.8												
SW													5.3				5.3	7.
WSW																		
W								8.7			8.7	20.4	10.5	5.3			15.8	13.
WNW							4.3	26.1			30.4	18.8	21.1	15.8			36.9	14.
NW	8.7				8.7	9.7	8.7	8.7			17.4	15.9	15.8				15.8	10.
NNW							8.7	4.3			13.0	9.1	15.8				15.8	7.
Total, percent	65.2				65.2	4.1	39.2	52.1			91.3	13.4	78.9	21.1			100.0	10.
	Percent 0–3 knots 34.8 Number of observations 23						Percent 0–3 knots 8.7 Number of observations 23						Percent 0–3 knots 0. Number of observations 1					

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N	25.0				25.0	9.3		7.2	7.1		14.3	22.3						
NNE		6.3			6.3	19.4							8.4				8.4	3.9
NE													8.4	8.3			16.7	15.5
ENE							7.1				7.1	7.8	8.3				8.3	5.8
E																		
ESE																		
SE																		
SSE	6.3				6.3	5.8												
S	6.3				6.3	7.8	7.1				7.1	11.6		8.3			8.3	15.5
SSW	6.3	6.2			12.5	15.5	14.3				14.3	9.7	8.3				8.3	7.8
SW	6.2				6.2	13.6							8.3				8.3	5.8
WSW							7.1				7.1	7.8						
W	12.5				12.5	6.8	7.2	7.1			14.3	14.6						
WNW	6.2				6.2	9.7	7.2				7.2	13.6	8.4	8.3			16.7	17.5
NW	12.5				12.5	7.2	7.1	14.3			21.4	13.6		8.3			8.3	23.3
NNW							7.2				7.2	7.8	8.4		8.3		16.7	26.2
Total, percent	81.3	12.5			93.8	9.9	64.3	28.6	7.1		100.0	13.0	58.5	33.2	8.3		100.0	15.1
	Percent 0–3 knots 6.2 Number of observations 16						Percent 0–3 knots 0.0 Number of observations 14						Percent 0–3 knots 0.0 Number of observations 12					

ABLE 11.—*Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for each direction*—Continued

EISMITTE, GREENLAND

(PERIOD MAY 28–OCTOBER 4)

	Surface 9,842 feet						13,100 feet						16,400 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
	5.4				5.4	7.8	5.9				5.9	8.7						
NE							8.8				8.8	8.3	3.0		2.9		5.9	18.4
E	5.4				5.4	10.7	8.8	5.9			14.7	12.0	8.8				8.8	9.1
NE	10.8				10.8	12.6	11.8				11.8	10.1	8.8	3.0	2.9		14.7	15.5
	16.3	5.4	2.7		24.4	14.0		3.0	2.9		5.9	26.2		3.0			3.0	19.4
SE		5.4			5.4	19.4		2.9			2.9	10.7	5.9	5.9			11.8	12.0
E	5.4	5.4			10.8	12.8	5.9	2.9			8.8	15.5		3.0	2.9		5.9	23.3
SE	13.5	2.7			16.2	11.3	5.9	11.8			17.7	17.1		8.8			8.8	21.3
	2.7				2.7	7.8	5.9				5.9	4.8		2.9			2.9	17.5
SW													3.0	2.9			5.9	17.5
W	2.7				2.7	11.6												
SW		5.4			5.4	22.3	3.0	2.9	2.9		8.8	21.9	3.0			2.9	5.9	24.6
														2.9			2.9	23.3
NW		2.7			2.7	15.5	2.9	5.9			8.8	16.9	3.0		2.9		5.9	22.3
W													3.0	2.9			5.9	15.5
NW	2.7				2.7	7.8							2.9	5.9			8.8	14.9
Total, percent	64.9	27.0	2.7		94.6	12.8	58.9	35.3	5.8		100.0	14.6	41.4	41.2	11.6	2.9	97.1	17.5
	Percent 0–3 knots 5.4 Number of observations 37						Percent 0–3 knots 0.0 Number of observations 34						Percent 0–3 knots 2.9 Number of observations 34					

	19,700 feet						23,000 feet						26,200 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
		3.0			3.0	17.5	3.1			3.0	6.1	24.2			3.3		3.3	29.1
NE	5.9		2.9		8.8	18.0	3.0	9.1			12.1	18.4	3.4	16.7	3.3	3.3	16.7	26.0
E	8.8	11.8			20.6	14.9	3.0	6.1	3.0		12.1	21.7	3.4	3.3	3.3	16.7	16.7	37.7
NE	3.0			2.9	5.9	26.2		3.1		3.0	6.1	49.6				3.3	3.3	42.8
							3.1			3.0	6.1	24.2	3.3				3.3	3.9
SE	3.0	2.9	2.9		8.8	25.2	3.0		6.1		9.1	22.7	3.4		3.3		6.7	24.2
E		3.0	2.9		5.9	16.1		3.1			3.1	15.5		3.4	3.3		6.7	27.2
SE		5.9			5.9	25.2	3.0	9.1			12.1	21.0		3.4	3.3		6.7	25.2
		5.9	2.9		8.8	20.0			3.0		3.0	31.0			3.3		3.3	29.1
SW									3.0		3.0	29.1						
W	3.0				3.0	5.8	3.0				3.0	9.7						
VSW	3.0			2.9	5.9	47.6		3.0			3.0	17.5		3.3			3.3	21.3
V			2.9		2.9	34.9			3.0		3.0	38.9	3.4			3.3	6.7	29.1
VNW				2.9	2.9	56.4				3.0	3.0	69.9	3.4			3.3	6.7	33.0
NW		8.8			8.8	19.4	3.1	3.0	3.0		9.1	24.6			6.7	3.3	10.0	36.3
NNW	3.0	2.9			5.9	19.4		6.1			6.1	24.2			3.3		3.3	34.9
Total, percent	29.7	44.2	14.5	8.7	97.1	22.1	24.3	42.6	21.1	12.0	100.0	25.6	20.3	30.1	33.1	33.2	96.7	27.0
	Percent 0–3 knots 2.9 Number of observations 34						Percent 0–3 knots 0.0 Number of observations 33						Percent 0–3 knots 3.3 Number of observations 30					

TABLE 11.—*Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for each direction*—Continued

MACGREGOR ARCTIC EXPEDITION STATION

WINTER (DECEMBER–FEBRUARY)

	Surface (23 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N							1.2				1.2	5.8	1.4	1.3			2.7	14.5
NNE	2.3	1.2			3.5	9.3	2.3	1.2			3.5	13.0	4.0	6.8	2.7	4.0	17.5	25.6
NE	34.1				34.1	7.2	8.3	9.4	8.2	1.2	27.1	21.3	10.8	1.4	5.4	1.3	18.9	16.3
ENE	18.8	3.6			22.4	9.5	15.3	4.7			20.0	10.5	5.4				5.4	10.1
E	3.5	3.5			7.0	9.7	5.9				5.9	5.4	2.7				2.7	5.2
ESE													1.4				1.4	3.9
SE	1.2				1.2	3.3	1.2				1.2	3.9	1.4				1.4	9.7
SSE							3.5				3.5	3.5	6.7				6.7	6.6
S	1.2				1.2	7.8	8.2	2.4			10.6	11.1	9.5	4.0			13.5	10.1
SSW							9.4	1.2			10.6	9.9	10.8	1.4			12.2	10.9
SW							3.5				3.5	7.2	2.7				2.7	10.7
WSW	1.2				1.2	9.7												
W																		
WNW																		
NW													1.4				1.4	4.8
NNW													1.4	1.3			2.7	13.6
Total percent	62.3	8.3			70.6	7.4	58.8	18.9	8.2	1.2	87.1	12.8	59.6	16.2	8.1	5.3	89.2	14.0
Percent 0–3 knots	29.4						Percent 0–3 knots	12.9					Percent 0–3 knots	10.8				
Number of observations	85						Number of observations	85					Number of observations	74				

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	10–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N	3.8	3.7			7.5	13.2	5.7				5.7	7.8	5.3	5.2			10.5	19.4
NNE		1.9		1.9	3.8	35.9												
NE	7.6				7.6	6.8	2.8				2.8	5.8		5.2			5.2	17.5
ENE	3.8				3.8	5.8	2.9				2.9	9.7						
E	9.4	3.8			13.2	12.4		2.9			2.9	15.5	5.3				5.3	13.6
ESE	5.7	1.9			7.6	11.1		5.7			5.7	19.4				5.3	5.3	29.1
SE	3.8	1.8			5.6	9.7	8.6	8.5	2.9		20.0	19.6	10.5	15.8		5.3	31.6	22.3
SSE		5.6			5.6	21.9	5.7	2.8			8.5	9.7	5.3				5.3	5.8
S	3.8	7.5			11.3	14.4	8.5	5.7	2.9		17.1	14.6	15.8		5.2		21.0	13.6
SSW	1.9				1.9	5.8	2.9				2.9	3.9						
SW	1.9	1.9			3.8	12.6	2.9	2.8			5.7	13.6						
WSW	9.4				9.4	6.2												
W							2.9				2.9	13.6						
WNW	1.9				1.9	5.8												
NW		3.8			3.8	20.4	11.4	5.7	2.9		20.0	15.9		10.5			10.5	16.5
NNW	7.6				7.6	11.3								5.3			5.3	17.5
Total percent	60.6	31.9		1.9	94.4	12.2	54.3	34.1	8.7		97.1	14.2	42.2	42.0	10.5	5.3	100.0	18.0
Percent 0–3 knots	5.6						Percent 0–3 knots	2.9					Percent 0–3 knots	0.0				
Number of observations	53						Number of observations	35					Number of observations	19				

TABLE 11.—*Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for each direction*—Continued

MACGREGOR ARCTIC EXPEDITION STATION

SPRING (MARCH–MAY)

	Surface (23 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N							0.7	2.0			2.7	14.9		2.2		0.7	2.9	31.6
NNE	3.5				3.5	5.8	3.4	2.8	0.7		6.9	17.3	5.1	7.4	5.9	2.2	20.6	25.4
NE	18.6				18.6	6.6	4.1	14.5	11.7	1.4	31.7	25.6	5.9	9.6	6.6	1.5	23.6	22.5
ENE	20.7	4.1			24.8	9.3	9.0	5.5		.7	15.2	13.4	1.5	.7			2.2	10.1
E	8.3	3.4			11.7	9.1	2.7				2.7	7.4	4.4				4.4	6.8
ESE	3.4				3.4	5.0	.7				.7	3.1		.7			.7	15.5
SE													1.5				1.5	5.8
SSE							1.4				1.4	3.3	3.0	.7			3.7	8.1
S	1.4				1.4	3.3	4.1	.7			4.8	8.0	5.9	6.6			12.5	13.0
SSW	1.4				1.4	5.8	12.4	2.1			14.5	8.5	8.1	.7			8.8	10.1
SW	.7				.7	2.3	2.8				2.8	4.5	6.6	.8			7.4	9.7
WSW	.7				.7	2.3	1.4				1.4	3.9	.7				.7	2.9
W													1.5				1.5	3.9
WNW																		
NW																		
NNW								.7			.7	21.3	1.5	1.4			2.9	13.6
Total, percent	58.7	7.5			66.2	6.2	42.7	28.3	12.4	2.1	85.5	14.7	45.7	30.8	12.5	4.4	93.4	17.1
Percent 0–3 knots	33.8						14.5						6.6					
Number of observations	145						145						136					

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N	3.0	3.0	1.0	1.0	8.0	23.5	1.3	3.8	1.3		6.4	18.6	1.5	3.0	2.9		7.4	23.3
NNE	6.0	2.0	1.0	2.0	11.0	19.0	1.3	2.5	1.3	1.3	6.4	24.4		1.5			1.5	23.3
NE	4.0	6.0	3.0	1.0	14.0	19.6	2.6	3.8			6.4	16.3	3.0	2.9			5.9	15.1
ENE	13.0	1.0			14.0	9.1	5.1	5.1	1.3		11.5	18.0	1.5	8.8	1.4		11.7	18.0
E	6.0	1.0			7.0	9.5	7.7	2.5			10.2	12.2	4.4	1.5			5.9	14.2
ESE	3.0				3.0	7.2	5.1		1.3		6.4	12.6	5.8	4.4	1.5		11.7	18.0
SE	3.0				3.0	9.7	3.8	2.6			6.4	12.8	5.9	1.5			7.4	10.3
SSE	3.0				3.0	6.8	9.0				9.0	9.5	5.9				5.9	9.7
S	7.0	3.0			10.0	12.8	7.7	3.8			11.5	14.0	3.0	4.4			7.4	14.7
SSW	4.0				4.0	8.1	2.6				2.6	3.8	2.9				2.9	3.9
SW	3.0				3.0	4.5	1.3				1.3	7.8						
WSW	1.0				1.0	3.9		1.3			1.3	19.4	4.4				4.4	11.6
W	1.0				1.0	9.7							4.4				4.4	7.8
WNW	3.0				3.0	5.8		2.6			2.6	22.3	1.5	1.5	1.4		4.4	22.7
NW	4.0	1.0			5.0	10.5	3.9	3.8			7.7	15.9		2.9	1.5		4.4	23.3
NNW	4.0	1.0			5.0	10.7	6.4	1.3			7.7	8.7	7.4	4.4			11.8	15.5
Total, percent	68.0	18.0	5.0	4.0	95.0	13.0	57.8	33.1	5.2	1.3	97.4	14.4	51.6	36.8	8.7		97.1	15.7
Percent 0–3 knots	5.0						2.6						2.9					
Number of observations	100						78						68					

TABLE 11.—*Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for ea direction*—Continued

MACGREGOR ARCTIC EXPEDITION STATION

SUMMER (JUNE-ONLY)

	Surface (23 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Averag velocity
N																		
NNE	1.9				1.9	2.9		1.9			1.9	21.3	4.3	2.1	2.1		8.5	17.
NE	9.6				9.6	8.5	5.8	21.1			26.9	18.4	10.6	14.9	4.3		29.8	18.
ENE	7.7				7.7	6.8	13.5	7.7	1.9		23.1	14.0	6.4	4.2			10.6	11.
E	15.4				15.4	6.2		1.9			1.9	8.7	6.4				6.4	8.
ESE	7.7				7.7	4.8							2.1				2.1	3.
SE																		
SSE																		
S	1.9				1.9	3.3	3.9				3.9	11.6	6.4				6.4	5.
SSW	3.9				3.9	6.8	15.4	5.8	1.9		23.1	14.0	8.5				8.5	8.
SW	7.7				7.7	3.9	3.8				3.8	5.8	8.5	6.4			14.9	14.
WSW	7.7				7.7	4.3							4.3				4.3	7.
W	1.9				1.9	3.9												
WNW	1.9				1.9	5.8	1.9				1.9	3.9						
NW																		
NNW																		
Total, percent	67.3				67.3	4.7	44.3	38.4	3.8		86.5	13.2	57.5	27.6	6.4		91.5	12.
Percent 0–3 knots	32.7						13.5						8.					
Number of observations	52						52						4					

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N	7.3	9.8			17.1	17.5	8.6	2.8			11.4	13.2	7.1				7.1	8.7
NNE	2.4	4.9			7.3	16.1	2.9	2.8			5.7	15.5						
NE			4.9		4.9	32.0	2.9				2.9	11.6						
ENE	4.9				4.9	6.8		2.9			2.9	21.3						
E	4.9	2.4			7.3	11.1												
ESE	7.3				7.3	5.8	8.6	2.8			11.4	13.2	7.2	10.7			17.9	13.2
SE	7.3				7.3	7.8	8.5				8.5	7.2	3.6	3.6	3.5		10.7	16.5
SSE	12.2				12.2	9.1	11.4				11.4	9.7	10.7				10.7	9.7
S	9.8				9.8	6.2	8.5				8.5	5.8	3.6				3.6	11.6
SSW	2.5				2.5	3.9												
SW							2.9				2.9	7.8	3.6				3.6	13.6
WSW	2.4				2.4	3.9	8.5				8.5	6.4	3.6				3.6	3.9
W							2.9				2.9	13.6	3.6	3.5			7.1	13.6
WNW	4.9				4.9	4.8		2.9			2.9	17.5	3.6	3.5			7.1	11.6
NW	2.4				2.4	3.9	8.6				8.6	6.4	3.6				3.6	7.8
NNW	2.4				2.4	5.8	5.7	2.9			8.6	14.9	14.3	3.6			17.9	8.9
Total, percent	70.7	17.1	4.9		92.7	10.7	80.0	17.1			97.1	10.9	64.5	24.9	3.5		92.9	11.3
Percent 0–3 knots	7.3						2.9						7.1					
Number of observations	41						35						28					

BLE 11.—*Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for each direction*—Continued

MACGREGOR ARCTIC EXPEDITION STATION

AUTUMN (SEPTEMBER–NOVEMBER)

	Surface (23 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
							3.3	5.0			8.3	15.1	3.7	5.6			9.3	15.1
NE	6.7	3.3			10.0	11.6		5.0	1.7		6.7	25.6	1.8	13.0	7.4	5.6	27.8	28.9
	31.6	1.7			33.3	7.2	8.3	16.7	25.0	3.3	53.3	25.2	9.2	3.7	5.6	5.6	24.1	24.8
NE	11.7	3.3			15.0	10.5	8.3				8.3	7.4	3.7				3.7	5.8
	16.6	6.7			23.3	13.0	1.7				1.7	5.8	1.8				1.8	5.8
E	6.6				6.6	9.3							1.8				1.8	5.8
	1.7				1.7	5.8	1.7				1.7	3.9	1.8				1.8	3.9
E																		
							3.3	1.7			5.0	12.2		3.7			3.7	17.5
W							6.7				6.7	6.5	1.9	1.8			3.7	10.7
V	1.7				1.7	13.6	1.7				1.7	5.8	5.6	1.8			7.4	11.6
SW	1.7				1.7	3.9							3.7				3.7	3.9
NW	1.7				1.7	3.9												
W							3.3				3.3	3.9						
NW													1.9	3.7			5.6	14.2
Total, percent	80.0	15.0			95.0	9.3	38.3	28.4	26.7	3.3	96.7	18.4	36.9	33.3	13.0	11.2	94.4	19.8
	Percent 0–3 knots 5.0 Number of observations 60						Percent 0–3 knots 3.3 Number of observations 60						Percent 0–3 knots 5.6 Number of observations 54					

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
	5.4	5.4	5.4		16.2	20.8		7.4	3.7		11.1	26.6			6.3		6.3	29.1
NE		5.4	2.7		8.1	24.6		3.7	3.7		7.4	25.2	6.3				6.3	13.6
E		2.7	2.7	5.4	10.8	35.5	3.7				3.7	9.7	6.2				6.2	7.8
NE	16.3	2.7	2.7		21.7	13.2	7.4	3.7			11.1	14.2						
							3.7				3.7	11.6	6.3	6.2			12.5	14.6
SE							3.7				3.7	5.8						
E	5.4	2.7			8.1	10.3		3.7			3.7	23.3						
SE														6.2			6.2	15.5
	2.7				2.7	5.8												
SW							3.7	3.7			7.4	15.5						
W	5.4	2.7			8.1	9.7	3.7				3.7	11.6	18.8				18.8	10.3
SW							3.7				3.7	3.9						
	2.7				2.7	7.8	3.7				3.7	5.8	6.2				6.2	11.6
NW	2.7				2.7	9.7	3.7		3.7		7.4	11.6		6.2			6.2	21.3
W	2.7	2.7			5.4	13.6	3.7				3.7	9.7	6.3	6.2			12.5	16.5
NW	5.4	5.4			10.8	13.2	7.5	3.7	7.4		18.6	21.3		12.5	6.3		18.8	27.7
Total, percent	48.7	29.7	13.5	5.4	97.3	16.7	48.2	25.9	18.5		92.6	15.3	50.1	37.3	12.6		100.0	17.3
	Percent 0–3 knots 2.7 Number of observations 37						Percent 0–3 knots 7.4 Number of observations 27						Percent 0–3 knots 0.0 Number of observations 16					

TABLE 11.—*Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for ea direction*—Continued

MOUNT EVANS, GREENLAND

WINTER (DECEMBER–FEBRUARY)

	Surface (1,294 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N	2.0	0.5			2.5	5.2	2.5				2.5	7.8	2.5	1.6			4.1	11.
NNE	1.0				1.0	2.9	4.5	1.5			6.0	10.1	5.1	1.5	0.5		7.1	10.
NE	10.6				10.6	4.7	6.5	1.0			7.5	9.5	3.6	1.5	.5		5.6	13.
ENE	18.1				18.1	6.4	8.6	1.5			10.1	8.9	6.1	.5			6.6	8.
E	11.1	1.5			12.6	8.1	8.1	2.0	0.5		10.6	11.3	3.6	.5			4.1	7.
ESE	3.0	3.5	1.0		7.5	16.1	9.6	4.5	.5	0.5	15.1	13.8	3.0				3.0	5.
SE	1.0	4.0		0.5	5.5	16.9	4.0	6.1	2.5		12.6	17.8	4.6	4.6	1.6	0.5	10.7	18.
SSE	1.0	3.0	1.0	.5	5.5	19.2	3.5	4.1	2.0		9.6	17.7	7.1	9.1	4.1	1.0	21.3	21.
S	1.5		.5		2.0	12.0	3.0	2.0		.5	5.5	15.1	5.6	5.6	2.0		13.2	17.
SSW	1.5		.5		2.0	10.9	4.0	.5			4.5	8.1	6.6	2.0	1.0		9.6	14.
SW	2.5				2.5	4.7	.5				.5	5.8	2.5	.5			3.0	10.
WSW	1.0				1.0	8.7	2.0	.5			2.5	7.4	1.0	.5			1.5	11.
W	2.0	.5	.6		3.1	13.0	1.0	.5		.5	2.0	19.0	1.5				1.5	8.
WNW	1.5				1.5	5.2	1.5				1.5	5.4	1.6				1.6	9.
NW	1.5				1.5	4.8							1.0				1.0	7.8
NNW	3.5		.5		4.0	7.2	2.0				2.0	5.0	.5	1.0			1.5	16.1
Total, percent	62.8	13.0	4.1	1.0	80.9	8.9	61.3	24.2	5.5	1.5	92.5	12.4	55.9	28.9	9.1	1.5	95.4	14.7
Percent 0–3 knots	19.1						7.5						4.6					
Number of observations	199						199						197					

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N	2.9	1.1			4.0	10.5		0.8			0.8	11.6	3.4				3.4	11.1
NNE	2.3	1.1			3.4	12.0	1.5	1.6			3.1	14.4		2.3			2.3	21.3
NE	2.3	1.1			3.4	13.0	2.3	.8			3.1	10.7	1.1	1.1	1.1	1.2	4.5	27.7
ENE	4.0	2.3	0.6		6.9	14.4	.8	1.5	0.8		3.1	21.0						
E	3.4	.6			4.0	9.9	2.3				2.3	7.8	1.1				1.1	11.6
ESE	2.3	1.7			4.0	16.7	1.5	2.3			3.8	14.7	4.5	1.1			5.6	11.6
SE	1.7	2.9	1.7	1.1	7.4	24.1	3.1	6.1	.8	2.3	12.3	23.1	6.7	4.5			11.2	13.6
SSE	6.4	5.7	3.4	3.4	18.9	26.0	5.4	8.5	1.5	.8	16.2	21.5	1.1	7.8	2.3		11.2	21.1
S	5.7	6.9	5.1	2.3	20.0	23.5	5.4	4.6	5.4	2.3	17.7	26.8	4.5	5.6	6.8	1.1	18.0	22.9
SSW	5.1	3.4	2.3		10.8	18.2	5.4	4.6	1.5	.8	12.3	17.8	2.3	3.4	1.1	2.2	9.0	26.0
SW	4.0	1.1			5.1	12.2	6.1	1.5	.8		8.4	13.6	2.3	6.7	2.2		11.2	19.2
WSW	1.7	.6			2.3	10.7	5.4				5.4	9.3	6.8	1.1			7.9	10.3
W	2.3	.6			2.9	10.9	2.3	.8			3.1	8.7	3.4	3.4			6.8	14.6
WNW	1.7				1.7	9.7	.8	.7			1.5	10.7	1.1				1.1	7.8
NW	.6				.6	4.8	.8				.8	4.8	1.1	1.1			2.2	10.7
NNW	1.7	.6			2.3	11.6	1.5	.8			2.3	9.7	1.1		1.1		2.2	22.3
Total, percent	48.1	29.7	13.1	6.8	97.7	18.8	44.6	34.6	10.8	6.2	96.2	18.2	40.5	38.1	14.6	4.5	97.7	18.4
Percent 0–3 knots	2.3						3.8						2.3					
Number of observations	175						130						89					

TABLE 11.—*Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for each direction*—Continued

MOUNT EVANS, GREENLAND

SPRING (MARCH–MAY)

	Surface (1,294 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N	3.5				3.5	7.8	4.9	0.4			5.3	8.9	3.1			0.5	3.6	15.1
NNE	6.2	0.4			6.6	8.5	8.0	.9	0.4		9.3	10.7	6.7	0.9			7.6	8.5
NE	4.0				4.0	5.6	5.3	.4			5.7	7.4	8.0	.9			8.9	8.9
ENE	11.5	.5			12.0	6.6	8.4	.4			8.8	6.8	5.4	.4			5.8	6.2
E	12.8	.9			13.7	7.6	9.3	.4			9.7	8.7	4.5	.4			4.9	7.6
ESE	7.5	.9	0.5		8.9	9.1	8.8	4.0			12.8	10.3	4.5	.9			5.4	9.5
SE	3.1	2.6	.9		6.6	15.1	3.5	1.8	2.7		8.0	17.8	6.7	4.0		.5	11.2	13.4
SSE	5.3	1.8	.9		8.0	14.2	2.7	4.4	.9	0.4	8.4	18.0	6.3	6.7			13.0	13.8
S	5.8	.4	.4		6.6	10.9	2.7	3.1	.9		6.7	17.7	6.3	7.1	2.2		15.6	17.7
SSW	1.3				1.3	5.2	2.2	.5			2.7	8.5	4.5	1.8			6.3	11.4
SW	1.3	.5			1.8	12.6	2.2	.5			2.7	7.6	3.1				3.1	7.2
WSW	1.8				1.8	5.4	1.8	.4			2.2	6.8	2.2				2.2	5.0
W	1.3	.5			1.8	12.6	2.2	.9	.4		3.5	11.4	.9	.4			1.3	9.3
WNW	3.5				3.5	7.4	2.2				2.2	7.2	1.3				1.3	4.3
NW	2.7				2.7	6.6	1.3				1.3	4.8	1.3				1.3	3.9
NNW	4.0	.4			4.4	6.8	.9	.4	.5		1.8	11.1	.9				.9	4.8
Total, percent	75.6	8.9	2.7		87.2	8.9	66.4	18.5	5.8	.4	91.1	11.1	65.7	23.5	2.2	1.0	92.4	11.3
Percent 0–3 knots	12.8						8.9						7.6					
Number of observations	226						226						224					

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N	3.5				3.5	6.4	1.2	3.0			4.2	19.4		1.7	1.8		3.5	25.2
NNE	2.5	2.0			4.5	13.6												
NE	1.5				1.5	5.4	.6				.6	9.7	0.9				.9	9.7
ENE	1.5	.5			2.0	11.3	.6				.6	13.6						
E	3.0	1.5			4.5	11.6	1.2				1.2	8.7	.9				.9	7.8
ESE	4.4				4.4	8.1	.6	1.8			2.4	18.0	.9	2.5			3.4	19.4
SE	3.9	3.0			6.9	13.4	2.4	4.3	1.8		8.5	18.4	1.7	3.5	.9	0.8	6.9	23.3
SSE	4.9	5.0	1.5	1.0	12.4	20.6	3.0	6.7	3.0	0.6	13.3	21.5	4.3	5.2	1.7	2.6	13.8	25.4
S	7.4	8.4	1.0	3.0	19.8	21.7	6.1	10.3	6.7	1.2	24.3	21.9	4.3	8.6	9.5	5.2	27.6	28.5
SSW	6.9	7.9	2.0	.5	17.3	18.4	6.1	10.3	4.8	2.4	23.6	23.7	2.6	8.6	1.7	2.6	15.5	26.2
SW	3.9	1.5	.5		5.9	13.4	.6	2.4	.6		3.6	21.3	1.7	1.7	.9		4.3	21.7
WSW	4.9				4.9	8.5	1.2	1.2	.6		3.0	17.5	.9		.8		1.7	23.3
W	2.0				2.0	9.7	3.1	.6	.6		4.3	14.4	1.7	.9		.8	3.4	21.3
WNW	1.5				1.5	5.2	4.3				4.3	9.9	1.7	6.1			7.8	18.6
NW	2.5				2.5	7.2	3.1	1.2			4.3	14.2	.9	3.4	.9	.8	6.0	23.9
NNW	1.5				1.5	5.2		1.2	.6		1.8	22.7		2.6	1.7		4.3	25.6
Total, percent	55.8	29.8	5.0	4.5	95.1	15.1	34.1	43.0	18.7	4.2	100.0	20.8	22.5	44.8	19.9	12.8	100.0	24.8
Percent 0–3 knots	4.9						0.0						0.0					
Number of observations	202						165						116					

TABLE 11.—*Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for each direction*—Continued

MT. EVANS, GREENLAND

SUMMER (JUNE–AUGUST)

	Surface (1294 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N	5.6				5.6	10.1	4.5	1.1	0.6		6.2	12.4	7.0	0.6			7.6	7.6
NNE	2.8				2.8	7.4	3.9				3.9	5.8	15.3	.6	.6		16.5	9.1
NE	5.1				5.1	7.6	7.3	1.1			8.4	7.2	8.2	.6			8.8	8.0
ENE	12.3	.6			12.9	9.1	14.6	.6			15.2	7.8	5.3	1.2			6.5	8.3
E	21.9	.6			22.5	8.5	10.7	3.3			14.0	9.7	4.7				4.7	6.4
ESE	12.4				12.4	7.8	7.9	1.1			9.0	8.1	2.3			0.6	2.9	14.0
SE	7.8				7.8	7.6	5.0	.6			5.6	8.5	7.0	1.8			8.8	9.9
SSE	3.4	1.1			4.5	11.6	3.4				3.4	6.6	4.7	1.8			6.5	13.0
S	3.9	2.8	1.1		7.8	16.7	1.7	1.7	2.8		6.2	21.1	5.3	2.9	1.2		9.4	13.8
SSW	3.9		.6		4.5	11.6	1.7	.6	1.1		3.4	17.7	1.8	2.9			4.7	17.1
SW	.6				.6	9.7	1.7				1.7	5.8	1.8	.6			2.4	10.3
WSW	1.1				1.1	9.7	1.1				1.1	13.6	1.2				1.2	6.8
W	2.3	1.1			3.4	12.6	2.8	1.1			3.9	10.3	3.5				3.5	7.0
WNW	1.7				1.7	11.1	1.7				1.7	11.6	.6				.6	7.8
NW	1.1				1.1	7.2	1.1	.6			1.7	9.7	.6				.6	3.3
NNW	2.2	.6			2.8	9.7							2.9				2.9	5.6
Total, percent	88.1	6.8	1.7		96.6	9.5	69.1	11.8	4.5		85.4	9.9	72.2	13.0	1.8	.6	87.6	9.7
Percent 0–3 knots	3.4						14.6						12.4					
Number of observations	178						178						170					

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity	4–14	15–28	29–41	Over 41	Total percent	Average velocity
N	5.3		0.7		6.0	8.0	1.8				1.8	4.5	2.3	1.1			4.4	9.7
NNE	6.0				6.0	8.7	5.5	1.8			7.3	10.3	4.5	1.1			5.6	8.7
NE	8.0	0.7			8.7	8.9	2.8				2.8	11.1		1.1			1.1	17.5
ENE	2.7				2.7	6.6	.9				.9	7.8						
E	7.3				7.3	5.8	2.8				2.8	8.3	1.1				1.1	3.9
ESE	2.7				2.7	5.8	6.4				6.4	9.1	3.3				3.3	9.1
SE	3.3		.7		4.0	11.4	8.3	4.6			12.9	11.4	4.4	6.7			11.1	13.6
SSE	3.3	2.7	.7		6.7	11.6	6.4	1.8			8.2	10.9	7.8	3.3			11.1	12.8
S	9.3	4.0	.7	0.7	14.7	13.8	7.3	5.5			12.8	14.4	4.4	5.6	2.2		12.2	17.3
SSW	8.0	4.7	1.3		14.0	14.9	6.4	4.6	0.9		11.9	14.0	5.6	10.0			15.6	15.1
SW	3.3	2.0			5.3	10.1	7.4	1.8			9.2	10.5	4.5	1.1			5.6	12.4
WSW	5.3				5.3	8.7	3.7	1.8			5.5	8.3	2.2	5.6	1.1		8.9	19.6
W	1.3				1.3	3.9	2.8	.9			3.7	9.3	4.5	2.2			6.7	11.1
WNW							1.8				1.8	5.8	2.2				2.2	8.7
NW	1.3	.7			2.0	11.1	2.8				2.8	7.2	4.5	1.1	1.1		6.7	13.0
NNW	4.0				4.0	8.3	2.8	.9			3.7	12.2						
Total, percent	71.1	14.8	4.1	.7	90.7	10.3	69.9	23.7	.9		94.5	10.9	52.3	38.9	4.4		95.6	13.6
Percent 0–3 knots	9.3						5.5						4.4					
Number of observations	150						109						90					

BLE 11.—*Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for each direction*—Continued

MT. EVANS, GREENLAND

AUTUMN (SEPTEMBER–NOVEMBER)

	1,294 feet						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total, percent	Average velocity	4–14	15–28	29–41	Over 41	Total, percent	Average velocity	4–14	15–28	29–41	Over 41	Total, percent	Average velocity
	0.6				0.6	5.8	0.6		0.6		1.2	12.6	1.8				1.8	9.7
E	.6	0.6			1.2	10.3	2.4				2.4	5.8	6.2	1.8			8.0	10.5
	6.9				6.0	6.6	6.7	0.6			7.3	7.6	5.6	.6	0.6		6.8	8.9
E	26.7				26.7	7.0	13.4	.6			14.0	7.6	6.2				6.2	7.4
	21.2	.6			21.8	6.8	13.4	3.0			16.4	8.1	3.7				3.7	6.0
E	14.0				14.0	8.7	13.4	3.0			16.4	10.3	4.3				4.3	8.0
	3.7		0.6		4.3	12.0	9.1	3.6	.6	0.6	13.9	13.0	6.7	3.1			9.8	8.9
E	1.8	1.2	.6		3.6	12.4	3.0	2.4			5.4	12.8	6.8	5.5	1.8	0.6	14.7	15.5
	2.5	1.2	1.2		4.9	13.0	1.9	.6	.6	1.2	4.3	26.6	9.8	4.3		.6	14.7	14.0
W	1.8				1.8	7.2	1.8		.6		2.4	10.9	7.4	1.8	.6		9.8	11.8
		1.2			1.2	10.4	1.2	.6	.6		2.4	11.8	3.1	.6	.6		4.3	14.0
SW	1.2				1.2	8.7	.6				.6	5.8	3.1				3.1	5.2
	.6				.6	2.5	1.2				1.2	5.8	.6				.6	7.8
NW							.6				.6	7.8	1.2	.6			1.8	11.1
W	.6				.6	7.8							1.2				1.2	5.8
NW	1.2				1.2	5.4	.6				.6	5.8	.6				.6	5.8
Total, percent	82.5	4.8	2.4		89.7	8.1	69.9	14.4	3.0	1.8	89.1	10.3	68.3	18.3	3.6	1.2	91.4	11.1
	Percent 0–3 knots					10.3	Percent 0–3 knots					10.9	Percent 0–3 knots					8.6
	Number of observations					165	Number of observations					165	Number of observations					163

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total, percent	Average velocity	4–14	15–28	29–41	Over 41	Total, percent	Average velocity	4–14	15–28	29–41	Over 41	Total, percent	Average velocity
	3.4	0.7			4.1	10.1	3.3				3.3	8.5	2.9	3.0			5.9	17.5
NE	2.7	3.4			6.1	15.1	4.2	0.8			5.0	8.9	3.0	1.0			4.0	13.6
E	1.3	.7			2.0	14.2	2.5				2.5	6.8	2.0	1.0			3.0	10.3
NE	2.7	.7			3.4	8.7	2.5	.8			3.3	8.7	2.9	2.0			4.9	13.6
	2.7				2.7	4.8	1.7	.8			2.5	13.0	3.9	1.0			4.9	10.5
SE	4.7	3.4	0.7		8.8	14.7	4.1	2.5	0.8		7.4	14.7	1.0	3.9			4.9	19.4
E	6.8	2.0	.7		9.5	13.4	7.5	4.1			11.6	14.0	3.0	2.9	1.0		6.9	19.2
SE	7.4	2.0	.7	0.7	10.8	15.1	2.5	11.6	1.6		15.7	18.8	1.0	8.9	1.0		10.9	19.0
	5.4	6.1	2.0		13.5	17.3	5.0	7.4	3.3		15.7	20.0	3.0	10.9	4.9		18.8	23.5
SW	8.1	2.7	2.7	1.4	14.9	20.0	5.0	1.6			6.6	11.3	4.9	4.0	1.0		9.9	16.3
W	5.4		2.7		8.1	18.0	6.6	1.7	.8		9.1	13.4	4.9	3.0			7.9	11.6
VSW	4.1	2.0		.7	6.8	15.3	.8	.8	.9		2.5	17.5	3.0	1.0			4.0	8.9
V	3.4	.6			4.0	8.1	1.6				1.6	6.8	3.0				3.0	9.7
VNW	1.3	.7			2.0	11.1	.8				.8	6.8	3.0	1.0			4.0	11.6
NW	.7	.6			1.3	11.6	2.5				2.5	8.3	3.0				3.0	9.1
NNW	1.3				1.3	7.8	1.7	1.6			3.3	11.1		1.0			1.0	17.5
Total, percent	61.4	25.6	9.5	2.8	99.3	14.9	52.3	33.7	7.4		93.4	14.0	44.5	44.6	7.9		97.0	16.3
	Percent 0–3 knots					0.7	Percent 0–3 knots					6.6	Percent 0–3 knots					3.0
	Number of observations					148	Number of observations					121	Number of observations					101

TABLE 11.—*Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for each direction*—Continued

MYGGBUKTA, GREENLAND

SUMMER (JUNE 18–AUGUST 10, 1927)

	Surface (7 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total, percent	Average velocity	4–14	15–28	29–41	Over 41	Total, percent	Average velocity	4–14	15–28	29–41	Over 41	Total, percent	Average velocity
N							2.8				2.8	3.9	5.7				5.7	5.8
NNE							5.7				5.7	6.8	8.5				8.5	4.8
NE							5.7				5.7	5.8	2.9				2.9	5.8
ENE							2.9				2.9	3.9						
E							5.7				5.7	4.8	2.9				2.9	11.6
ESE	2.8				2.8	5.8							2.9				2.9	5.8
SE	45.7				45.7	3.5												
SSE							2.9				2.9	4.8						
S							5.7				5.7	5.8	2.9				2.9	9.7
SSW							5.7				5.7	2.9	5.7				5.7	4.5
SW	5.7				5.7	3.9	5.7				5.7	3.9	14.3				14.3	7.0
WSW													5.7				5.7	6.8
W							2.9				2.9	3.9						
WNW							14.3	2.8			17.1	5.8	34.3				34.3	6.6
NW	2.9				2.9	2.9	2.9				2.9	5.8	8.5				8.5	8.9
NNW	2.9				2.9	3.9												
Total, percent	60.0				60.0	3.3	62.9	2.8			65.7	4.7	94.3				94.3	6.6
Percent 0–3 knots	40.0						34.3						5.7					
Number of observations	35						35						35					

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total, percent	Average velocity	4–14	15–28	29–41	Over 41	Total, percent	Average velocity	4–14	15–28	29–41	Over 41	Total, percent	Average velocity
N	8.8				8.8	7.2	3.2				3.2	4.8	3.4	3.3			6.7	14.6
NNE													3.4				3.4	3.9
NE	5.9				5.9	5.8							3.3				3.3	4.8
ENE	2.9				2.9	7.8												
E	2.9				2.9	3.9												
ESE													3.3				3.3	5.8
SE							3.2				3.2	9.7		3.3			3.3	15.5
SSE																		
S		5.9			5.9	16.5		3.2			3.2	12.6		3.3			3.3	8.7
SSW	2.9	5.9			8.8	12.2	3.3	6.4			6.4	19.4						
SW	5.9				5.9	9.7		3.2			6.5	14.6	3.3	6.7			10.0	14.9
WSW	3.0	2.9			5.9	10.3		6.5			6.5	16.5	3.3	6.7			10.0	14.9
W	8.8	3.0			11.8	10.7	6.5											
WNW	26.5	2.9			29.4	7.8	29.0	6.5			6.5	4.8	3.3				3.3	11.6
NW	3.0	2.9			5.9	14.6	3.2	6.5			35.5	9.9	26.7	3.3			30.0	10.3
NNW											9.7	13.6	3.3	6.7			10.0	17.5
Total, percent	70.6	23.5			94.1	9.3	48.4	32.3			80.7	10.5	53.3	33.3			86.6	11.3
Percent 0–3 knots	5.9						19.3						13.4					
Number of observations	34						31						30					

TABLE 11.—*Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for each direction*—Continued

REYKJAVIK, ICELAND

WINTER (DECEMBER–FEBRUARY)

	Surface (98 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total, percent	Average velocity	4–14	15–28	29–41	Over 41	Total, percent	Average velocity	4–14	15–28	29–41	Over 41	Total, percent	Average velocity
N	2.5	1.3			3.8	9.7	3.8	2.5			6.3	10.9	4.3	1.4			5.7	11.3
NNE	2.5	3.8	1.2		7.5	17.5	3.8	1.3			5.1	11.6	2.9				2.9	11.6
NE	2.5				2.5	5.2	2.6	2.5			5.1	8.9	5.7				5.7	6.2
ENE	5.0	2.5	1.3		8.8	16.7	3.8	3.8			7.6	15.1	4.3	5.7			10.0	14.7
E	5.0	8.8	1.2		15.0	17.7	3.8	1.3	3.8		8.9	18.2	1.4	4.3	1.4		7.1	21.0
ESE	3.8	3.7			7.5	13.6	2.5	7.6			10.1	17.8	4.3	1.4	2.9		8.6	20.0
SE	3.7		2.5		6.3	15.9	2.5		1.3		3.8	20.8	2.9	1.4			4.3	14.9
SSE	2.5	2.5	1.2		6.2	15.9	8.8	1.3	2.5		12.6	13.2	5.7	4.3	1.4		11.4	16.5
S	3.8				3.8	11.6	1.3				1.3	4.8	1.4	2.9	1.4		5.7	19.4
SSW	1.3	7.5			8.8	18.0		6.3	2.5		8.8	23.1	4.3	4.3	1.4		10.0	19.2
SW			1.2		1.2	29.1		3.8			3.8	22.7		4.3	1.4		5.7	23.3
WSW		1.2			1.2	15.5		2.5			2.5	19.4		1.4			1.4	17.5
W	1.2	5.0			6.2	16.7	1.3	5.0			6.3	18.2	1.4	4.3	1.4		7.1	20.6
WNW	2.5				2.5	9.7							1.4	2.9			4.3	14.2
NW	2.5				2.5	5.8	1.3				1.3	11.6	2.9				2.9	5.8
NNW	1.3	1.2			2.5	10.3	2.6	2.5			5.1	14.0	2.9	1.4			4.3	13.6
Total, percent	40.1	37.5	8.6		86.2	13.6	38.1	40.4	10.1		88.6	14.9	45.8	40.0	11.3		97.1	16.3
Percent 0–3 knots	13.8						Percent 0–3 knots	11.4					Percent 0–3 knots	2.9				
Number of observations	80						Number of observations	79					Number of observations	70				

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total, percent	Average velocity	4–14	15–28	29–41	Over 41	Total, percent	Average velocity	4–14	15–28	29–41	Over 41	Total, percent	Average velocity
N	2.1				2.1	7.8			2.8		2.8	29.1		4.0			4.0	19.4
NNE	4.2	6.2			10.4	13.6								4.0	4.0		8.0	27.2
NE	6.3				6.3	7.2		8.3			8.3	22.7				4.0	4.0	42.7
ENE	2.1	2.1			4.2	17.5	2.8	11.1			13.9	21.3	4.0		8.0		12.0	28.5
E	2.1	6.2	2.1		10.4	19.4		8.3			8.3	21.9		4.0			4.0	17.5
ESE	8.3				8.3	8.1		2.8			2.8	15.5						
SE		2.1			2.1	19.4		2.8			2.8	25.2		4.0			4.0	25.2
SSE			2.1		2.1	38.8			2.8		2.8	38.8	4.0				4.0	3.9
S	4.2	2.1			6.3	10.3												
SSW	2.1				2.1	5.8	2.8	2.8	2.7		8.3	20.8						
SW	2.1	8.3			10.4	19.4	5.5				5.5	7.8		4.0			4.0	19.4
WSW	2.1				2.1	3.0	2.8				2.8	5.8		4.0			4.0	17.5
W	4.2	6.2			10.4	14.7	2.8	8.3	2.8	2.8	16.7	27.7		12.0		8.0	20.0	33.0
WNW	4.1	2.1			6.2	13.6	5.5	2.8			8.3	11.1		4.0			4.0	21.3
NW	4.1	2.1			6.2	13.6	2.8	2.8	5.5		11.1	22.9	8.0	4.0		8.0	20.0	27.2
NNW	2.1	4.1			6.2	16.1	2.8		2.8		5.6	11.4	4.0	4.0			8.0	14.6
Total, percent	50.1	41.5	4.2		95.8	14.2	27.8	50.0	19.4	2.8	100.0	21.1	20.0	48.0	12.0	20.0	100.0	25.4
Percent 0–3 knots	4.2						Percent 0–3 knots	0.0					Percent 0–3 knots	0.0				
Number of observations	48						Number of observations	36					Number of observations	25				

TABLE 11.—*Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for each direction*—Continued

REYKJAVIK, ICELAND

SPRING (MARCH–MAY)

	Surface (98 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total, percent	Average velocity	4–14	15–28	29–41	Over 41	Total, percent	Average velocity	4–14	15–28	29–41	Over 41	Total, percent	Average velocity
N	8.2				8.2	7.8	5.6	0.7			6.3	6.8	7.7				7.7	7.8
NNE	4.1	2.7			6.8	11.3	3.5	.7			4.2	7.6	6.8				6.8	7.8
NE	2.7	2.0			4.7	10.5	3.5	3.5			7.0	11.8	5.1	3.4			8.5	11.8
ENE	4.8	2.7			7.5	12.6	5.6	2.8	.7		9.1	11.1	6.8	3.4			10.2	11.3
E	11.6	9.5	2.7	0.7	24.5	17.5	8.4	9.7	3.5	0.7	22.3	13.8	8.5	6.0	0.9		15.4	13.8
ESE	2.7	2.1			4.8	11.4	5.6	4.2			9.8	13.8	4.3	2.5	1.7	0.9	9.4	19.8
SE	3.4	4.7	.7		8.8	18.2	4.9	4.2	.7		9.8	15.9	8.6	5.1	1.7		15.4	16.3
SSE	2.7				2.7	6.2	3.5	.7			4.2	7.4	4.3	2.5			6.8	14.0
S	2.0	1.4			3.4	9.3	.7	.7			1.4	12.6	.9				.9	5.8
SSW	1.4				1.4	9.7	.7	.7			1.4	10.3		.9			.9	27.2
SW	2.0	1.4			3.4	12.4	1.4	2.8			4.2	16.5	2.6	1.7			4.3	15.1
WSW	1.4	1.3			2.7	14.6	3.5	.7	.7		4.9	10.5		.9			.9	25.2
W	2.7				2.7	9.3	3.5				3.5	7.4	2.5	.9			3.4	8.7
WNW	2.0	.7			2.7	10.1	1.4				1.4	9.7	.9				.9	5.8
NW	2.7				2.7	4.7	1.4				1.4	8.7	2.5	.9			3.4	12.6
NNW	4.8				4.8	6.0	2.8				2.8	5.2	3.4				3.4	8.7
Total percent	59.2	28.5	3.4	.7	91.8	12.2	56.0	31.4	5.6	.7	93.7	12.6	64.9	28.2	4.3	.9	98.3	13.2
	Percent 0–3 knots 8.2 Number of observations 147						Percent 0–3 knots 6.3 Number of observations 143						Percent 0–3 knots 1.7 Number of observations 117					

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total, percent	Average velocity	4–14	15–28	29–41	Over 41	Total, percent	Average velocity	4–14	15–28	29–41	Over 41	Total, percent	Average velocity
N	6.1	2.4			8.5	12.2	2.9	10.3			13.2	16.9	3.5	8.6	3.4		15.5	20.2
NNE	6.1	3.6			9.7	12.4	4.4	1.5	1.4		7.3	18.6		5.2			5.2	18.8
NE	3.6	1.2	2.4		7.2	19.0	2.9	2.9	1.5		7.3	21.3	6.9		1.7	1.7	10.3	18.4
ENE	4.9	3.6	1.2		9.7	15.9	4.4	3.0			7.4	11.3	1.7	3.5			5.2	16.9
E	4.8				4.8	7.8	3.0	4.4			7.4	14.7	1.8	1.7			3.5	8.3
ESE	3.6	3.6	1.2		8.4	15.5	4.4	4.4	1.5		10.3	16.1	3.4	5.2			8.6	16.3
SE	4.9	3.6	2.4		10.9	19.4	1.5	2.9			4.4	19.4	1.8		1.7		3.5	20.4
SSE	6.0		1.2		7.2	13.6	3.0	4.4			7.4	17.1	1.7	3.5			5.2	13.0
S		2.4	1.2		3.6	25.2	2.9				2.9	10.7						
SSW	1.2				1.2	11.6							1.7	3.5			5.2	14.2
SW		1.2			1.2	19.4	1.5	1.4			2.9	16.5	1.7	1.7			3.4	19.4
WSW	2.4	1.2			3.6	9.7	1.5	1.4			2.9	15.5	1.7	1.7			3.4	11.6
W	2.4	2.4	1.2		6.0	17.1	4.4	1.5		1.5	7.4	21.7	1.7	3.5	1.7	1.7	8.6	28.7
WNW	2.4	2.4			4.8	13.2	1.5	4.4			5.9	19.8	3.5	3.4	3.4		10.3	18.8
NW	2.4	1.2	1.2		4.8	18.4	3.0	2.9			5.9	14.9	3.5	1.7			5.2	13.6
NNW	7.2				7.2	8.7	4.4	3.0			7.4	13.2	1.8	1.7	1.7		5.2	18.8
Total, percent	58.0	28.8	12.0		98.8	14.9	45.7	48.4	4.4	1.5	100.0	16.7	36.4	44.9	13.6	3.4	98.3	18.0
	Percent 0–3 knots 1.2 Number of observations 83						Percent 0–3 knots 0.0 Number of observations 68						Percent 0–3 knots 1.7 Number of observations 58					

TABLE 11.—*Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for each direction*—Continued

REYKJAVIK, ICELAND

SUMMER (JUNE–AUGUST)

	Surface (98 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total, percent	Average velocity	4–14	15–28	29–41	Over 41	Total, percent	Average velocity	4–14	15–28	29–41	Over 41	Total, percent	Average velocity
N	5.4	2.4			7.8	11.3	5.8	2.2			8.0	11.6	9.4	0.8			10.2	8.7
NNE	3.6	2.4			6.0	13.6	2.9	2.2			5.1	13.4	6.2	4.7		0.8	11.7	13.4
NE	.6				.6	7.8	1.4				1.4	3.9	7.8	1.6			9.4	9.1
ENE	3.6				3.6	5.0	5.8				5.8	6.2	6.3				6.3	7.8
E	4.2	1.2			5.4	9.7	2.2	1.4			3.6	11.2	5.4	.8			6.2	12.0
ESE	2.4	.6			3.0	12.0	2.2	1.4			3.6	9.3	3.1	1.6			4.7	10.1
SE	4.8	3.0			7.8	13.2	4.4	4.3			8.7	16.1	3.1	.8			3.9	11.3
SSE	2.4	1.2			3.6	8.5	4.4	1.4			5.8	11.8	3.1	.8			3.9	12.4
S	1.8	1.8			3.6	14.6	2.2	3.6			5.8	14.0	1.6	2.3	0.8		4.7	17.5
SSW	3.6	1.8			5.4	11.1	2.2	.7			2.9	8.9	3.1				3.1	7.8
SW	.6	3.6			4.2	14.7	3.7	2.9	0.7		7.3	14.4	5.5	4.7			10.2	14.7
WSW	3.0	1.2			4.2	7.8	3.6	2.9			6.5	11.4	1.5	.8			2.3	11.6
W	5.4	.6			6.0	7.2	5.8	1.4			7.2	9.7	2.3	1.6			3.9	11.6
WNW	11.3	.6			11.9	7.6	5.8				5.8	6.4	3.1	.8			3.9	10.1
NW	8.4				8.4	7.0	5.1				5.1	7.0	2.3	.8			3.1	9.7
NNW	6.6	2.4			9.0	9.9	8.7	1.5			10.2	10.7	7.8				7.8	8.0
Total, percent	67.7	22.8			90.5	9.7	66.2	25.9	.7		92.8	10.9	71.6	22.1	.8	.8	95.3	10.9
Percent 0–3 knots						9.5						7.2						4.7
Number of observations						167						138						128

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total, percent	Average velocity	4–14	15–28	29–41	Over 41	Total, percent	Average velocity	4–14	15–28	29–41	Over 41	Total, percent	Average velocity
N	6.9	3.9			10.8	14.2	6.6	7.6	3.3		17.5	18.6	3.6	7.3	2.4	1.2	14.5	21.5
NNE	11.8	3.9			15.7	12.0	3.3	1.1			4.4	11.6	4.8	3.6			8.4	14.4
NE	7.9	2.9	1.0		11.8	14.0	6.6	7.7			14.3	14.4	9.7	6.0			15.7	13.0
ENE	2.9	1.0			3.9	9.7	4.4		1.1		5.5	13.6		1.2			1.2	17.5
E	2.9	1.0			3.9	9.7	2.2	1.1			3.3	10.3	1.2	2.4			3.6	11.6
ESE	2.0	1.9			3.9	13.6	2.2	2.2			4.4	14.6	1.2	3.6			4.8	15.9
SE	2.0	3.9			5.9	13.0	2.2		1.1		3.3	17.5	1.2		1.2		2.4	24.2
SSE		1.0	.9		1.9	22.3	2.2	1.1			3.3	13.0						
S	2.0				2.0	6.8	1.1				1.1	11.6	2.4	1.2			3.6	14.7
SSW	3.9	1.0	1.0		5.9	13.2	2.2	1.1			3.3	11.1	1.2	3.6			4.8	16.5
SW	2.0	1.9			3.9	14.6	3.3	1.1			4.4	11.6	2.4				2.4	6.8
WSW	1.9	1.0			2.9	13.0	3.3	2.2			5.5	10.1	3.6	1.2			4.8	11.2
W	1.0	3.9			4.9	17.5	4.4				4.4	9.7		2.4			2.4	15.5
WNW	1.9	1.0			2.9	14.9	2.2	2.2	1.1		5.5	20.2	7.3	3.6		1.2	12.1	15.3
NW	8.8	2.0			10.8	8.7	2.2	4.4			6.6	18.8	2.4	3.6	1.2		7.2	21.3
NNW	5.9	1.9			7.8	12.9	6.6	3.3	1.1		11.0	13.2	4.9	4.8	2.4		12.1	17.6
Total, percent	63.8	32.2	2.9		98.9	12.8	55.0	35.1	7.7		97.8	14.6	45.9	44.5	7.2	2.4	100.0	16.3
Percent 0–3 knots						1.1						2.2						0.0
Number of observations						102						91						83

TABLE 11.— *Percentage frequency of winds from each direction and for different velocity groups, also average velocity (in knots) for each direction*—Continued

REYKJAVIK, ICELAND

AUTUMN (SEPTEMBER–NOVEMBER)

	Surface (98 feet)						1,600 feet						3,300 feet					
	4–14	15–28	29–41	Over 41	Total, percent	Average velocity	4–14	15–28	29–41	Over 41	Total, percent	Average velocity	4–14	15–28	29–41	Over 41	Total, percent	Average velocity
N	9.1	4.5			13.6	11.8	11.3	4.8			16.1	10.7	6.8	2.2			9.0	9.3
NNE	3.4	5.7			9.1	14.2	9.7	8.0			17.7	11.6	5.6	5.6			11.2	12.8
NE	2.3	2.3			4.6	10.1	1.6				1.6	3.9	6.8	2.2			9.0	7.6
ENE	4.5	2.3			6.8	9.9	11.3	4.8			16.1	9.9	6.7	3.4			10.1	13.0
E	8.0	4.5			12.5	11.3	1.6	3.3			4.9	16.1	4.5	1.1			5.6	12.8
ESE	3.4	2.3			5.7	12.2	4.8	3.3			8.1	10.3	3.4	3.3			6.7	12.8
SE	4.5	2.3			6.8	10.3	1.6	1.6			3.2	8.3	4.5	4.5	1.1		10.1	14.2
SSE	2.3	1.1			3.4	14.9							3.4				3.4	6.4
S	2.3	2.3			4.6	12.0	1.6	1.6			3.2	11.6						
SSW	1.1	2.3			3.4	15.5	3.2		1.6		4.8	18.8	2.3	2.2			4.5	12.6
SW	4.6				4.6	10.1	3.3	3.2			6.5	14.6	1.1	4.5			5.6	17.8
WSW	1.1				1.1	3.9	1.6				1.6	2.9	3.4				3.4	7.4
W	1.1				1.1	3.9							1.2				1.2	5.8
WNW													3.4				3.4	7.2
NW	2.3				2.3	5.8	6.5				6.5	4.7						
NNW	6.8				6.8	6.4	1.6				1.6	7.8	5.6	2.2			7.8	10.5
Total, percent	56.8	29.6			86.4	10.5	59.7	30.6	1.6		91.9	10.5	58.7	31.2	1.1		91.0	11.3
Percent 0–3 knots	13.6						Percent 0–3 knots	8.1					Percent 0–3 knots	9.0				
Number of observations	88						Number of observations	62					Number of observations	89				

	6,600 feet						9,800 feet						13,100 feet					
	4–14	15–28	29–41	Over 41	Total, percent	Average velocity	4–14	15–28	29–41	Over 41	Total, percent	Average velocity	4–14	15–28	29–41	Over 41	Total, percent	Average velocity
N		7.1	1.2		8.3	20.8	1.3	5.3	2.6		9.2	25.0	3.2	3.2	4.9	1.6	12.9	29.5
NNE	8.3	7.2			15.5	12.8	2.6	6.6			9.2	15.3	1.6	4.9			6.5	17.5
NE	5.9	2.4			8.3	11.8	6.6	9.2			15.8	14.0	4.9	4.8			9.7	13.6
ENE	8.3	4.8			13.1	12.8	6.6	2.6			9.2	10.3	6.5	6.4			12.9	15.1
E	4.7				4.7	8.1	4.0	1.3			5.3	12.0	3.2	1.6			4.8	13.0
ESE	5.9				5.9	8.9	2.6				2.6	5.2	3.2	1.6			4.8	12.2
SE	1.2	2.4	1.2		4.8	19.8	4.0	1.3			5.3	10.1	4.8				4.8	7.8
SSE	1.2	1.2			2.4	13.6	1.3				1.3	11.6		1.6			1.6	15.5
S	2.4				2.4	10.7	2.6				2.6	9.7						
SSW	1.2	2.4			3.6	14.9	1.3	1.3			2.6	18.4	3.2				3.2	9.7
SW	3.6	3.5			7.1	18.0		1.3			1.3	17.5		1.6			1.6	25.2
WSW	3.6				3.6	10.3	4.0				4.0	9.1	3.3	1.6	1.6		6.5	19.4
W							1.3	4.0			5.3	12.0	1.6	1.6	1.6		4.8	20.0
WNW	3.6				3.6	10.3	1.3		1.3		2.6	20.4	1.6	4.9	1.6		8.1	21.0
NW	3.6	1.2			4.8	10.7	2.6	6.6		1.3	10.5	19.8		4.9	1.6		6.5	18.0
NNW	3.6	5.9	1.2		10.7	17.7	1.3	7.9			9.2	20.2	3.3	1.6	3.2		8.1	22.1
Total, percent	57.1	38.1	3.6		98.8	13.8	43.4	47.4	3.9	1.3	96.0	15.1	40.4	40.3	14.5	1.6	96.8	18.2
Percent 0–3 knots	1.2						Percent 0–3 knots	4.0					Percent 0–3 knots	3.2				
Number of observations	84						Number of observations	76					Number of observations	62				

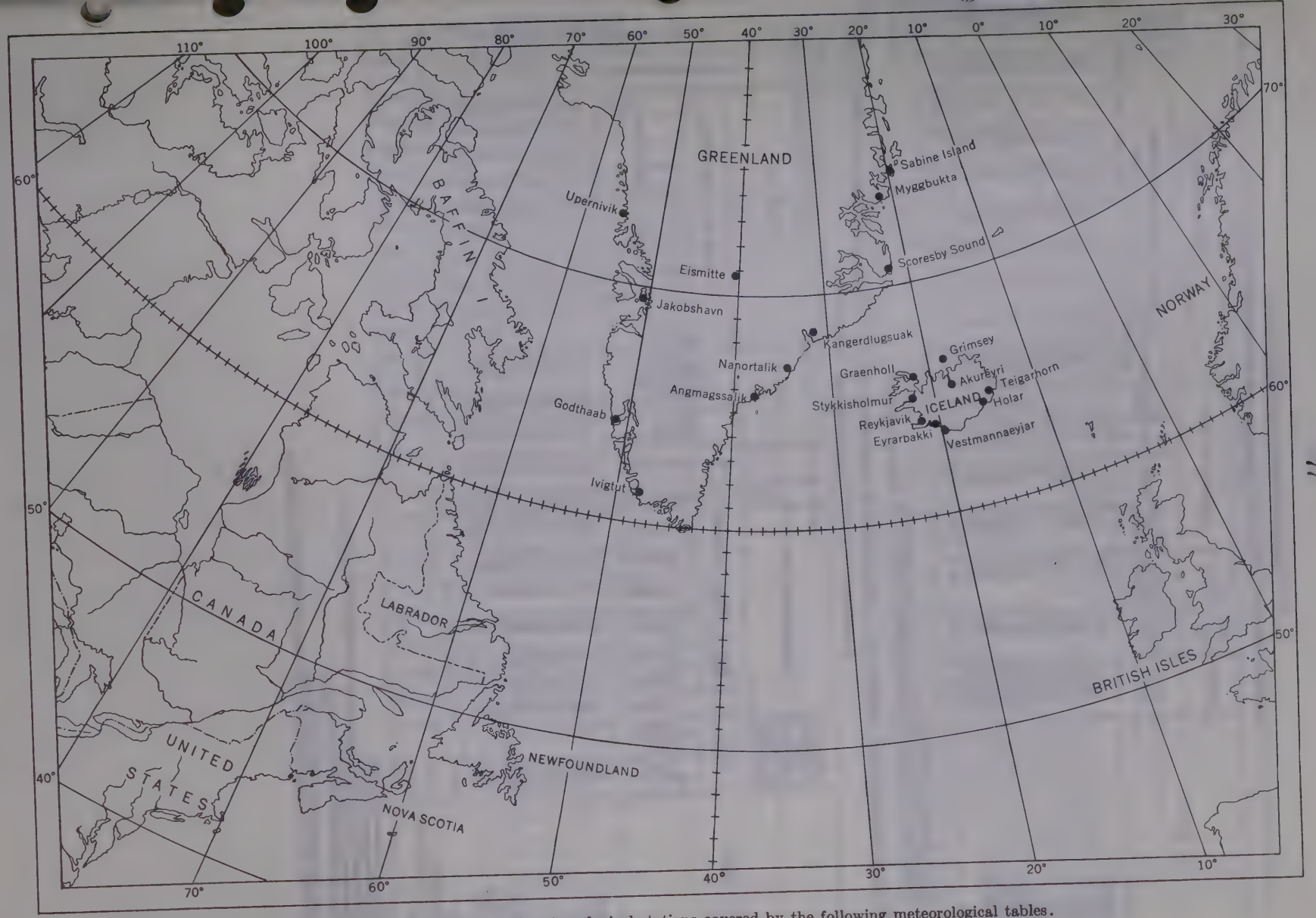


CHART 29.—Location and names of meteorological stations covered by the following meteorological tables.

TABLE 12.—*Meteorological tables*

STATION: AKUREYRI, ICELAND. LATITUDE 65°41′ N.; LONGITUDE 18°05′ W.

Month	Pressure	Temperature	Precipitation	Number of days with—				Wind directions								Mean wind force 0-12
								Percent of all observations from—								
	Daily mean [1]	Daily mean (° F.)	Average monthly (inches) [2]	Precipitation [2]	Snow [3]	Fog [2]	Gale 9 up [3]	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	
January	1000.4	26	1.3	15	8.4	1.2	.....	12	4	2	9	39	3	1	2	28	2.1
February	1002.6	26	1.2	14	9.0	.9	.....	11	2	4	14	34	3	1	3	28	2.2
March	1007.4	27	1.1	14	8.0	.7	.....	15	2	3	12	29	5	1	3	30	2.1
April	1013.1	33	1.0	13	7.8	2.7	.....	27	4	5	10	22	1	1	5	25	2.1
May	1016.4	40	.9	12	2.5	3.9	.....	41	5	7	6	17	1	0	4	19	2.3
June	1012.6	49	.9	9	.3	4.7	.....	50	2	2	3	20	1	1	5	16	2.3
July	1010.7	51	.9	11	.....	.7	.....	47	1	1	4	24	0	0	4	19	2.1
August	1010.4	48	1.0	13	.07	3.3	.....	42	2	3	5	15	1	0	5	27	1.8
September	1007.7	44	1.2	14	1.1	3.5	.....	29	1	1	9	28	2	1	3	26	2.1
October	1007.7	36	1.1	15	6.5	1.5	.....	19	3	3	7	31	2	1	4	30	1.8
November	1004.8	30	1.2	16	6.7	1.0	.....	13	5	3	9	37	2	1	3	27	2.1
December	1000.4	27	1.5	16	8.4	1.4	.....	14	3	3	10	34	4	1	2	29	2.1
Year	1007.7	37	13.3	160	58.77	37.9	.....	27	3	3	9	27	2	1	3	25	2.1

[1] At mean sea level in millibars.
[2] Precipitation and number of days, and days of fog are from Modruvellir.
[3] Average taken over 15 years. For remaining columns, averages taken for more than 10 years.

STATION, ANGMAGSSALIK, GREENLAND. LATITUDE 65°37′ N.; LONGITUDE 37°33′ W. HEIGHT ABOVE MEAN SEA LEVEL, 95 FEET

[Meteorological table compiled from about 30 years' observations.]

Month	Pressure at mean sea level, reduced to 32° F. and latitude 45°		Air temperature, (° F.)							Relative humidity (percent)	Cloud amount (0-10)	Rain			Wind										Number of days gales [4]	Number of days fogs
	Mean			Mean daily		Mean monthly		Extreme				Average fall (inches)	Number of days [5]	Maximum fall in 24 hours [5] (inches)	Mean velocity (knots)	Percentage of observations from—											
	For month (mb.)	Daily amplitude (mb.)	Average [1]	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum							N.	NE	E.	SE.	S.	SW	W.	NW	Calm		
January	997	.....	17	23	10	38	−7	48	−23	83	6.7	3.3	16	3.4	.....	9	10	9	2	4	3	10	7	46	2	6.8
February	1002	.....	14	21	7	36	−10	50	−23	82	6.1	2.0	12	2.0	.....	7	9	6	3	4	3	10	6	52	1	1
March	1007	.....	18	27	10	42	−7	52	−26	81	6.1	2.4	13	1.7	.....	5	9	7	3	5	3	10	6	52	2	1
April	1011	.....	24	35	16	48	−2	57	−14	79	6.1	2.4	13	2.2	.....	5	6	6	3	6	3	8	6	57	0.7	3
May	1015	.....	33	43	27	53	14	61	4	77	6.3	2.4	13	5.0	.....	3	5	5	5	12	3	6	2	59	.3	7
June	1013	.....	41	50	34	60	27	77	22	74	6.2	2.1	11	1.7	.....	2	5	8	7	18	3	4	3	50	.2	9
July	1011	.....	44	54	37	64	29	77	27	73	5.6	1.9	10	1.7	.....	2	4	8	7	20	2	3	3	51	.1	9
August	1012	.....	42	52	36	63	29	77	22	72	5.4	2.4	10	3.2	.....	3	4	7	5	16	3	4	4	54	.4	8
September	1008	.....	37	45	32	55	24	70	18	73	6.3	3.7	13	2.7	.....	7	8	6	4	10	2	4	4	55	.6	4
October	1007	.....	30	35	25	47	14	56	6	80	6.8	5.7	15	3.9	.....	10	7	7	2	5	3	8	7	51	1	3
November	1003	.....	23	28	17	41	3	55	−13	80	6.7	3.3	15	3.2	.....	12	8	6	3	3	4	12	7	45	.4	1.5
December	999	.....	19	25	14	39	−3	47	−21	81	6.6	2.8	15	3.1	.....	10	10	8	2	3	4	10	6	47	.9	.4
Mean	1007	.....	29	37	22	[6]67	[6]−14	.....	.....	78	6.2	.....	.....	.....	.....	6	7	7	4	9	3	7	5	52	.....	.....
Total	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	34.4	156	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	48
Extreme values	.....	.....	.....	.....	.....	.....	.....	77	−26	.....	.....	.....	.....	5.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Number of years' observations	35	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

[1] Reduced to mean of 24 hours.
[2] Day with trace or more rain.
[3] Maximum fall during the 24 hours from one morning observation to the next.
[4] Force 9 or over on Beaufort scale.
[5] Mean of highest each year and lows each year.

Hours of observation 0800, 1400, 2100, zone time.
Authorities: MS. data supplies by Det. Danske Meteorologiske Institut, Copenhagen.

TABLE 12.—*Meteorological tables*—Continued

STATION: EISMITTE (ICE CAP REGION), GREENLAND. LATITUDE 70°54′ N., LONGITUDE 40°42′ W. HEIGHT ABOVE MEAN SEA LEVEL 9,941 FEET

Month	Pressure at mean sea level: Mean: For month (mb.)	Pressure at mean sea level: Mean: Daily amplitude (mb.)	Air temperature (°F.): Average [1]	Air temperature (°F.): Mean daily: Maximum	Air temperature (°F.): Mean daily: Minimum	Air temperature (°F.): Mean monthly: Maximum	Air temperature (°F.): Mean monthly: Minimum	Air temperature (°F.): Extremes: Maximum	Air temperature (°F.): Extremes: Minimum	Relative humidity percent	Cloud amount (0–10)	Rain: Average fall	Rain: Number of days	Rain: Maximum fall in 24 hours	Wind: Mean force Beaufort scale	Wind: Percentage of observations from—: N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	Number of days, gales	Number of days, fogs
January			−42					6	−84		6.6		19		3	2	3	42	33	13	5	1	1			15
February			−53					−9	−84		4.9		13		3	2	9	40	26	9	10	3	1			14
March			−40					4	−85		5.4		18		3	0	5	24	36	31	3	0	1			4
April			−24					10	−74		6.0		21		3	2	2	29	36	27	1	0	3			1
May			−4					16	−46		6.0		19		3	1	0	12	25	38	20	3	1			6
June			4					23	22		5.4		15		3	7	22	34	18	10	2	4	3			1
July			12					27	−19		7.7		20		3	4	14	40	24	12	2	1	3			2
August			1					22	−31		6.0		17		3	8	13	32	28	8	4	3	4			13
September			−8					17	−42		5.3		15		3	0	10	30	22	20	13	5	0			15
October			−32					8	−79		5.4		18		3	3	18	36	23	17	2	1	0			25
November			−46					−2	−74		5.2		15		3	1	18	48	23	7	2	1	0			16
December			−22					−3	−83		5.7		13		4	0	11	65	20	3	1	0	0			20
Mean			−22					27	−83		5.8		203		3	3	11	36	26	16	5	2	1			133
Total																									

[1] Mean of day.

Hours of observations, 0800, 1400, 2000.
Authority: Wegener Greenland Expedition. Table compiled from observations for 1930–31.

STATION, EYRARBAKKI, ICELAND. LATITUDE 63°52′ N.; LONGITUDE 21°09′ W.

Month	Pressure: Daily mean	Temperature: Daily mean (° F.)	Precipitation: Average monthly (inches)	Number of days with—: Precipitation	Snow	Fog	Gale 9 up	Wind directions: Percent of all observations from—: N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	Mean wind force 0–12
January		29	5.0	17	10	1.3	1.3	10	33	13	9	10	11	9	3	2	5.2
February		29	3.9	14	9	2.0	1.1	10	31	14	9	10	10	10	4	2	4.9
March		30	3.6	13	7	1.2	.6	10	39	14	10	7	7	8	3	2	4.9
April		36	3.1	13	3	.9	.7	12	27	13	13	10	10	7	5	3	3.5
May		43	2.0	13	1	1.5	.4	8	19	12	18	13	15	8	5	2	4.6
June		49	2.5	15		1.2	.2	9	11	7	17	16	20	11	7	2	4.6
July		52	2.4	14		1.2	.2	10	10	17	18	22	10	6	6	4	4.3
August		51	2.5	13		1.0	.3	12	13	9	16	12	18	10	6	4	4.3
September		45	4.5	19	.1	.9	.5	11	20	11	13	11	15	8	6	5	4.4
October		38	4.5	15	1.8	.5	.7	18	29	13	7	6	9	9	6	3	4.5
November		32	4.5	16	3.7	1.4	1.0	10	32	15	10	8	8	10	4	3	4.6
December		29	4.5	15	6.7	1.2	1.0	11	34	15	10	7	10	8	3	2	4.8
Year		30	43.6	177	42.3	14.3	8.1	11	25	12	12	10	13	9	5	3	4.5

TABLE 12.—*Meteorological tables*—Continued

STATION, GODTHAAB, GREENLAND. LATITUDE 64°11′ N.; LONGITUDE 51°43′ W. HEIGHT ABOVE MEAN SEA LEVEL, 66 FEET

[Meteorological table compiled from 25–55 years' observations]

Month	Pressure at mean sea level, reduced to 32° F. and latitude 45°		Air temperature (° F)							Relative humidity (percent)	Cloud amount (0–10)	Rain			Wind										Number of days gales [5]	Number of days fogs
	Mean		Mean daily		Mean monthly		Absolute								Mean force, Beaufort scale	Percentage of observations, from—										
	For month (mb.)	Daily amplitude [1] (mb.)	Average [2]	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum			Average fall (mm.)	Number of days [3]	Maximum fall in 24 hours [4] (mm.)		N.	NE.	E.	SE.	S.	SW	W.	NW	Calm		
January	998	0.1	14	19	10	39	−4	52	−20	85	7.3	35	13	41	3.7	18	29	20	5	4	9	3	6	6	0.9	0.6
February	1001	0	14	20	9	38	−4	51	−17	86	6.9	43	12	51	3.8	20	26	20	6	4	8	3	7	6	1	.7
March	1005	.1	19	24	13	41	−1	53	−19	87	6.8	41	13	53	3.7	20	27	16	5	6	11	3	5	7	1	1
April	1010	.3	25	31	20	45	7	56	−6	85	6.9	30	11	41	3.6	19	27	12	3	6	14	3	5	11	.8	3
May	1012	0	33	40	29	51	19	61	11	83	6.8	43	10	63	3.1	20	21	8	2	8	19	3	4	15	.4	7
June	1009	.3	40	47	34	60	29	74	22	82	6.8	36	10	47	3.0	17	13	5	2	10	23	6	6	18	.3	10
July	1010	.1	44	52	38	63	33	76	29	85	6.6	57	10	84	2.6	14	9	5	2	12	24	8	7	19	.3	13
August	1009	.3	43	51	38	61	33	71	27	86	6.9	79	12	77	2.8	13	11	6	3	13	25	6	4	19	.4	13
September	1006	.1	38	43	34	53	27	62	18	85	6.8	85	13	64	3.0	11	20	11	3	11	21	4	3	16	1	7
October	1005	0	31	35	26	46	16	65	6	84	6.7	64	13	78	3.2	10	24	19	4	8	17	3	2	13	1	2
November	1003	.1	24	28	19	42	8	58	−1	85	6.6	48	13	63	3.5	10	25	24	5	8	13	2	3	10	1	.9
December	999	.1	18	23	14	40	1	59	−14	85	6.8	37	12	67	3.6	14	29	23	5	4	10	3	3	9	1	.8
Mean	1006	0	29	34	24	[6] 66	[6] −8			85	6.8				3.3	15	21	15	4	8	16	4	5	12		
Total												598	142												9	59
Extreme values								76	−20					84												
Number of years' observations	50		40	50	40	50	40	50	25	50	45				50										55	

[1] Range between 0800 and 1400.
[2] Mean of day.
[3] Day with 0.1 mm. or more rain.
[4] Maximum fall during the 24 hours from one morning observation to the next.
[5] Force 9 or over.
[6] Mean of highest each year and lowest each year.

Hours of observation, 0800; 1400, 2100.
Authorities: MS. data supplied by Danish Meteorological Institute, Copenhagen.

STATION, GRAENHOLL, ICELAND. LATITUDE 65°59′ N.; LONGITUDE 21°22′ W.

Month	Pressure	Temperature	Precipitation	Number of days with—				Wind directions									Mean wind force 0–12
	Daily mean	Daily mean (°F.)	Average monthly (inches)	Precipitation	Snow	Fog	Gale 9 up	Percent of all observations from—									
								N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	
January		28	1.4			1.6	1.2	18	16	10	5	11	11	17	10	2	4.6
February		27	1.1			.9	1.9	20	15	10	5	13	9	14	10	4	4.2
March		27	.8			.4	1.0	19	15	8	5	12	10	18	8	5	4.1
April		31	.7			.7	1.0	25	24	10	5	7	5	12	7	5	3.9
May		37	1.0			3.7	.4	31	26	11	4	5	3	13	4	3	4.0
June		44	1.3			5.3	.4	37	24	7	5	6	4	9	4	4	3.5
July		46	2.7			12.7	.4	46	14	3	4	9	7	10	4	3	3.5
August		45	2.7			10.6	.1	43	22	8	4	5	4	5	4	5	3.5
September		43	2.8			4.4	.5	26	23	7	5	11	7	12	6	3	4.2
October		38	2.5			2.2	.4	24	22	11	4	6	6	17	7	3	4.3
November		32	1.5			.8	.7	18	20	14	5	9	9	18	8	1	5.0
December		29	1.1			1.7	1.8	21	17	10	5	10	8	17	10	2	4.6
Year		36	19.6			41.3	8.7	27	20	9	5	9	7	13	7	3	4.1

TABLE 12.—*Meteorological tables*—Continued

STATION, GRIMSEY, ICELAND. LATITUDE 66°33′ N.; LONGITUDE 18°01′ W. HEIGHT ABOVE MEAN SEA LEVEL, 72 FEET

[Meteorological table compiled from 9–59 years' observations, 1874–1932]

Month	Pressure at mean sea level, reduced to 32° F. and latitude 45°		Air temperature °F.						Relative humidity (percent)	Cloud amount—(0–10)	Rain			Wind									Number of days gales [5]	Number of days fogs
	Mean		Mean	Mean daily		Mean monthly		Extreme							Percentage of observations, from—									
	For month (mb.) [1]	Daily amplitude (mb).	Average [2]	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum			Average fall (inches)	Number of days [3]	Maximum fall in 24 hours (inches) [4]	Mean velocity (knots)	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm		
January	1000		28	33	24	44	9	49	−23			0.7	10	0.6		5	8	25	16	11	8	14	8	5	2	0.3
February	1003		27	32	23	42	9	50	−5			.7	10	.8		2	7	27	16	12	9	15	5	7	2	.3
March	1007		26	32	23	42	6	49	−11			.6	10	.5		4	10	26	14	10	7	13	5	11	1	2
April	1011		30	35	25	46	11	56	−5			.5	9	.6		7	14	30	15	7	4	6	7	10	.5	2
May	1015		35	40	32	53	21	64	10			.6	8	1.1		8	11	31	17	5	3	7	6	12	.3	5
June	1013		42	48	37	60	30	70	20			.8	6	.8		7	6	31	9	1	1	9	12	24	.2	5
July	1011		45	51	41	62	35	75	27			1.1	8	.8		7	7	31	13	2	2	8	8	13	.1	7
August	1010		44	50	40	60	34	79	27			1.4	10	.8		7	7	31	13	2	2	8	8	13	.2	7
September	1008		42	46	37	55	29	65	12			1.4	11	1.3		6	11	40	11	2	1	8	5	9	.9	3
October	1008		37	40	32	50	22	58	12			1.4	12	1.3		6	11	29	18	8	4	10	5	10	.9	.9
November	1005		32	36	27	46	15	53	5			1.1	12	1.1		6	10	30	14	6	4	13	7	4	2	.2
December	1000		30	34	25	44	12	50	−5			.8	11	.7		5	8	25	16	9	10	18	5	7	2	.4
Mean	1008		35	40	31	[6] 62	[6] 2					11.1	117	1.3		5	10	29	14	7	5	12	7	11	12	33
Total								79	−23																35	35
Extreme values												40	48	59												
Number of years' observations	51		47	59												9										

[1] Observations at Akureyri, latitude 65°41′ N. longitude 18°5′ W. Height 23 feet.
[2] Reduced to mean of 24 hours.
[3] Day with trace or more rain.
[4] Maximum fall during the 24 hours from one morning observation to the next.
[5] Force 9 or over on Beaufort scale.
[6] Mean of highest each year and lowest each year.

Hours of observation 0800, 1400, 2100.
Authorities: MS data supplied by Vedurstofan, Reykjavik.

STATION, HOLAR, ICELAND. LATITUDE 64°18′ N.; LONGITUDE 15°11′ W.

Month	Pressure	Temperature	Precipitation	Number of days with—				Wind directions [2]								Mean wind force 0–12 [2]
	Daily mean [1]	Daily mean (°F.)	Average monthly (inches)	Precipitation [2]	Snow [2]	Fog [2]	Gale 9 up [3]	Percent of all observations from—								
								N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	
January	1000.0	30	8.6	13	7.7	0.3	0.1	6	22	22	3	4	17	11	8	7	2.9
February	1000.6	31	6.9	13	4.7	.3		4	17	30	6	3	17	13	6	4	3.0
March	1005.9	31	6.2	13	4.6	.6		7	18	25	5	3	13	14	8	7	2.8
April	1009.6	36	5.2	10	2.7	.7		11	20	29	4	2	7	16	5	6	2.7
May	1013.3	42	4.4	10	1.2	.5		6	22	40	3	1	4	14	6	4	2.9
June	1012.2	48	4.5	11	.3	1.5		2	6	42	3	1	7	26	7	6	2.5
July	1010.1	50	4.3	8		1.5		2	3	42	4	2	9	22	5	11	2.4
August	1009.3	49	4.3	11		2.1		3	9	40	3	1	6	21	8	9	2.4
September	1006.7	46	7.5	14	.3	1.7		9	13	23	5	2	15	14	11	8	2.5
October	1006.0	39	7.5	12	1.7	1.4		8	21	26	3	2	8	13	8	11	2.5
November	1004.1	34	7.2	14	2.7	.8	.1	8	18	23	4	2	12	14	12	7	2.7
December	999.4	31	7.6	14	4.7	.01	.1	7	20	22	5	3	15	12	8	8	2.8
Year	1006.6	39	74.2	142	30.6	11.41	.3	6	16	30	4	2	11	16	8	7	2.7

[1] At mean sea level in millibars.
[2] Precipitation and wind directions are from Fagurholsmyri.
[3] Average taken over 15 years, 1924–38. For remaining columns, mean taken over more than 10 years.

TABLE 12.—*Meteorological tables*—Continued

STATION, IVIGTUT, GREENLAND. LATITUDE 61°12′ N.; LONGITUDE 48°10′ W. HEIGHT ABOVE MEAN SEA LEVEL, 82 FEET

[Meteorological table compiled from 45–50 years' observations]

Month	Pressure at mean sea level, reduced to 32° F. and latitude 45°		Air temperature (° F)							Relative humidity (percent)	Cloud amount (0–10)	Rain			Wind										Number of days gales [5]	Number of days fogs
	Mean			Mean daily		Mean monthly		Absolute							Mean force, Beaufort scale	Percentage of observations, from—										
	For month (mb.)	Daily amplitude [1] (mb.)	Average [2]	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum			Average fall (mm.)	Number of days [3]	Maximum fall in 24 hours [4]		N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm		
January	998	0.3	19	24	12	44	−3	56	−18	....	5.8	83	12	149	1.3	11	6	4	17	6	4	1	5	46	0.6	0.2
February	1000	.1	19	26	12	45	−3	58	−20	....	5.4	66	10	112	1.3	10	5	4	16	7	5	1	5	47	.4	.2
March	1004	.1	24	31	16	47	−1	60	−17	....	5.5	85	12	123	1.1	10	4	3	15	7	4	1	6	50	.4	.4
April	1009	.1	31	38	24	52	9	61	−5	....	5.6	63	10	70	.9	11	2	1	14	5	5	2	8	52	.2	1
May	1012	.3	40	47	33	59	23	74	13	....	6.0	88	10	92	.8	9	2	2	10	8	7	5	10	47	.2	2
June	1009	.3	46	54	39	66	32	86	28	....	6.1	82	10	130	1.0	10	1	1	9	6	8	9	14	42	.2	4
July	1010	.4	50	57	42	67	36	74	33	....	5.8	79	9	124	.8	10	1	0	5	5	7	9	13	50	0	6
August	1010	.3	47	55	41	63	35	71	29	....	6.2	95	10	80	.8	8	1	1	8	4	6	7	9	56	.1	6
September	1005	.3	41	47	36	59	28	70	22	....	6.2	149	13	108	.9	9	2	1	11	4	4	2	11	56	.2	3
October	1005	.3	34	40	29	55	19	67	9	....	5.8	145	12	115	.9	10	3	2	14	3	3	1	5	59	.2	1
November	1003	.1	27	32	22	49	9	64	0	....	5.6	118	12	107	1.1	9	4	2	15	6	2	1	4	57	.3	.6
December	998	.3	21	27	16	45	2	60	−16	....	5.5	80	11	126	1.0	9	6	4	14	6	3	1	4	53	.3	.2
Mean	1005	.3	33	40	27	[6] 69	[6]−7	....	....	....	5.8	....	....	....	1.0	9	3	2	12	6	5	3	8	52	....	....
Total	....	....	....	....	....	....	....	....	....	....	....	1133	131	....	....	....	....	....	....	....	....	....	....	....	....	....
Extreme values	....	....	....	....	....	....	....	86	−20	....	....	....	....	149	....	....	....	....	....	....	....	....	....	....	3	25
Number of years observations	45			48	50	48	50	48	50	....	45	50			45											

[1] Range between 0800 and 1400.
[2] Mean of day.
[3] Day with 0.1 mm. or more rain.
[4] Maximum fall during the 24 hours from one morning observation to the next.
[5] Force 9 or over.
[6] Mean of highest each year and lowest each year.

Hours of observation, 0800, 1400, 2100.
Authorities.—MS. data supplied by Danish Meteorological Institute, Copenhagen.

STATION: JAKOBSHAVN, GREENLAND. LATITUDE 69°13′ N., LONGITUDE 51°02′ W. HEIGHT ABOVE MEAN SEA LEVEL, 102 FEET

[Meteorological table compiled from 30–52 years' observations]

Month	Pressure at mean sea level, reduced to 32°F. and latitude 45°.		Air temperature (°F)							Relative humidity (percent)	Cloud amount, (0–10)	Rain			Wind										Number of days gales [5]	Number of days fogs
	Mean			Mean daily		Mean monthly		Absolute							Mean force, Beaufort scale	Percentage of observations, from—										
	For month (mb.)	Daily Amplitude [1] (mb.)	Average [2]	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum			Average fall (mm.)	Number of days [3]	Maximum fall in 24 hours [4] (mm.)		N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm		
January	1003	0.4	0	8	−7	36	−25	49	−45	76	4.4	9	8	12	2.7	4	3	29	10	15	8	1	0	30	0.9	.....
February	1006	.3	−3	6	−10	34	−28	49	−46	74	3.9	9	7	9	2.1	4	2	21	11	15	7	1	0	39	.7	.....
March	1010	.4	3	14	−5	37	−26	48	−42	79	4.2	12	9	24	2.0	7	2	16	9	14	9	1	1	41	.6	.....
April	1013	.3	15	24	6	42	−13	55	−35	83	4.5	13	8	39	2.1	13	2	15	10	14	8	2	2	34	.3	.....
May	1014	.4	31	38	25	52	9	62	−10	77	4.8	15	8	19	2.2	20	2	11	8	10	9	8	4	28	.5	.....
June	1011	.4	40	46	35	59	28	67	21	73	4.9	21	8	22	2.4	18	2	6	8	9	11	16	7	23	.5	.....
July	1011	.3	46	51	40	62	35	71	28	71	4.8	31	8	28	1.9	10	2	5	9	8	8	17	6	35	.4	.....
August	1011	.3	44	50	38	61	31	66	24	71	4.8	35	9	29	2.1	10	2	9	11	9	7	12	4	36	.6	.....
September	1007	.3	35	41	30	54	19	65	8	75	5.0	32	11	34	2.4	12	3	23	11	10	6	4	1	30	.9	.....
October	1008	.1	25	31	20	47	6	58	−6	78	5.1	22	11	36	2.8	6	3	40	12	10	6	1	0	22	.8	.....
November	1007	.1	17	22	11	41	−4	54	−18	78	5.1	17	11	24	3.0	5	3	48	11	9	7	0	1	16	1	.....
December	1003	.....	9	15	4	39	−13	52	−34	77	4.8	13	10	10	2.8	4	3	45	13	10	8	0	0	17	1	.....
Mean	1009	.3	22	29	16	[6] 63	[6]−33	.....	.....	76	4.7	.....	.....	.....	2.4	9	2	23	10	11	8	5	2	30	.....	.....
Total	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Extreme values	.....	.....	.....	.....	.....	.....	.....	71	−46	.....	.....	229	108	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8	.....
Number of years' observations	52	52	52	32	50	32	50	32	50	30	50	.....	.....	39	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
															52											

[1] Range between 0800 and 1400.
[2] Mean of day.
[3] Day with 0.1 mm. or more rain.
[4] Maximum fall during the 24 hours from one morning observation to the next.
[5] Force 9 or over.
[6] Mean of highest each year and lowest each year.

Hours of observation, 0800, 1400, 2100.
Authorities:—MS. data supplied by Danish Meteorological Institute, Copenhagen.

TABLE 12.—*Meteorological tables*—Continued

STATION, KANGERDLUGSUAK, GREENLAND. LATITUDE 68°12′ N., LONGITUDE 32°12′ W.

Month	Pressure at mean sea level: Mean: For month (mb.)	Pressure at mean sea level: Mean: Daily amplitude (mb.)	Air temperature (° F.): Average [1]	Air temperature (° F.): Mean daily: Maximum	Air temperature (° F.): Mean daily: Minimum	Air temperature (° F.): Mean monthly: Maximum	Air temperature (° F.): Mean monthly: Minimum	Air temperature (° F.): Extremes: Maximum	Air temperature (° F.): Extremes: Minimum	Relative humidity (percent)	Cloud amount (0–10)	Rain: Average fall (inches)	Rain: Number of days	Rain: Maximum fall in 24 hours (inches)	Wind: Mean force Beaufort scale	Wind: Percentage of observations from—: North quadrant	Wind: Percentage of observations from—: South quadrant	Wind: Percentage of observations from—: Calm	Number of days, gales [2]	Number of days, fogs
January	1019	.....	3.6	.....	.....	12.0	−6.6	23.2	−14.2	.....	2.5	[3] T	4	.....	1.8	75	5	20	8	0
February	1022	.....	5.1	.....	.....	14.1	−5.3	39.0	−22.0	.....	4.9	1.9	7	.....	2.2	76	1	23	2	4
March	1018	.....	9.1	.....	.....	17.5	.5	31.0	−14.5	.....	5.5	.8	15	.....	1.8	63	2	35	2	3
April	1018	.....	23.9	.....	.....	39.3	13.7	50.2	−11.5	.....	6.0	2.0	14	.....	1.7	64	12	24	3	1
May	1015	.....	36.8	.....	.....	46.6	30.6	62.0	24.4	.....	7.7	6.4	18	.....	1.9	45	25	30	4	3
June	1011	.....	38.5	.....	.....	46.6	31.9	62.1	26.3	.....	6.8	1.8	15	.....	1.4	24	49	27	4	1
July	1015	.....	43.8	.....	.....	50.7	37.6	62.0	31.0	.....	5.9	.7	8	.....	1.7	28	59	13	2	2
August	1008	.....	41.7	.....	.....	49.1	35.9	57.0	32.0	.....	5.6	1.8	5	.....	2.3	43	46	11	5	1
September	1018	.....	33.2	.....	.....	39.3	28.1	46.0	21.9	.....	3.9	[3] T	2	.....	1.6	44	32	24	3	2
October	1004	.....	28.4	.....	.....	33.4	19.4	37.5	10.2	.....	7.0	1.8	13	.....	2.9	81	10	9	17	4
November	1004	.....	25.6	.....	.....	31.6	18.9	43.2	5.1	.....	7.7	5.9	12	.....	3.8	74	14	12	13	8
December	1016	.....	12.5	.....	.....	18.0	4.6	31.5	−6.2	.....	4.1	1.8	5	.....	3.1	84	4	12	8	1
Mean	1014	.....	24.8	.....	.....	.....	.....	62.1	−22.0	.....	2.1	.....	.....	.....	2.1	78	22	20	.....	.....
Total												25.0	119	.....					73	30

[1] Mean of day. [2] Force 9 or over. [3] Indicates trace, not measurable.

Authority: British East Greenland Expedition, 1935–36. Table compiled from observations, August 1935 to August 1936.

STATION, MYGGBUKTA, GREENLAND. LATITUDE 73°29′ N.; LONGITUDE 21°34′ W. HEIGHT ABOVE MEAN SEA LEVEL, 6.5 FEET

Month	Pressure at mean sea level: Mean: For month (mb)	Pressure at mean sea level: Mean: Daily amplitude (mb)	Air temperature (°F.): Average [1]	Air temperature (°F.): Mean daily: Maximum	Air temperature (°F.): Mean daily: Minimum	Air temperature (°F.): Mean monthly: Maximum	Air temperature (°F.): Mean monthly: Minimum	Air temperature (°F.): Extremes: Maximum	Air temperature (°F.): Extremes: Minimum	Relative humidity (percent)	Cloud amount (0–10)	Rain: Average fall (inches)	Rain: Number of days [2]	Rain: Maximum fall in 24 hours (inches)	Wind: Mean force Beaufort scale	Wind: Percentage of observations from—: N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	Number of days gales	Number of days fogs
January	.....	.....	−4.5	.....	.....	.....	.....	.....	.....	.....	4.2	0.2	4	.....	2.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	0
February	.....	.....	−6.5	.....	.....	.....	.....	.....	.....	.....	4.8	.4	5	.....	2.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
March	.....	.....	−5.6	.....	.....	.....	.....	.....	.....	.....	5.0	.2	5	.....	1.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
April	.....	.....	2.5	.....	.....	.....	.....	.....	.....	.....	4.1	.2	3	.....	1.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
May	.....	.....	19.4	.....	.....	.....	.....	.....	.....	.....	5.0	.03	2	.....	1.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
June	.....	.....	32.7	.....	.....	.....	.....	.....	.....	.....	6.4	.2	4	.....	1.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	6
July	.....	.....	38.6	.....	.....	.....	.....	.....	.....	.....	6.0	.5	4	.....	2.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	6
August	.....	.....	37.4	.....	.....	.....	.....	.....	.....	.....	6.5	.4	4	.....	1.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	7
September	.....	.....	27.5	.....	.....	.....	.....	.....	.....	.....	5.6	.03	2	.....	2.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	4
October	.....	.....	14.5	.....	.....	.....	.....	.....	.....	.....	4.9	.2	3	.....	2.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	0
November	.....	.....	4.0	.....	.....	.....	.....	.....	.....	.....	5.6	.4	10	.....	3.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
December	.....	.....	2.0	.....	.....	.....	.....	.....	.....	.....	4.9	.2	6	.....	2.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mean	.....	.....	13.1	.....	.....	.....	.....	.....	.....	.....	5.2	3.0	52	.....	2.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	28
Total	.....	.....										10	10	.....	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Number of years' observations	.....	.....	10							.....	.....														

[1] Mean of day.
[2] Days with 0.1 mm. or over.

Authority: Handbuch der Klimatologie. Bd. II, Berlin, 1935.

TABLE 12.—*Meteorological tables*—Continued

STATION, NANORTALIK, GREENLAND. LATITUDE 60°09′ N.; LONGITUDE 45°14′ W. HEIGHT ABOVE MEAN SEA LEVEL, 23 FEET

Month	Pressure at mean sea level		Air temperature (° F.)						Relative humidity (percent)	Cloud amount (0–10)	Rain			Wind										Number of days gales [3]	Number of days fog
	Mean			Mean daily		Mean monthly		Extremes							Percentage of observations from—										
	For month (mb)	Daily amplitude (mb)	Average [1]	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum			Average fall (inches)	Number of days [2]	Maximum fall in 24 hours (inches)	Mean force Beaufort scale	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm		
January			22.5			34.7	16.5				6.7		14		3.5	24	15	4	7	2	2	16	25	5	2.7	0.3
February			22.6			38.3	15.0				6.5		11		3.4	26	17	4	6	2	1	15	20	9	2.0	1
March			26.0			36.1	16.8				6.5		13		3.3	23	17	3	7	3	2	14	20	11	1.9	1
April			31.1			37.9	24.9				6.4		11		3.1	21	15	3	9	5	2	15	19	11	1.1	2
May			37.4			42.2	33.0				6.6		10		2.5	15	13	2	10	10	6	16	14	14	.6	7
June			41.0			46.7	35.9				6.8		11		3.0	14	10	2	10	14	7	17	12	14	.4	10
July			43.0			47.1	40.1				6.5		10		2.5	15	7	1	11	14	7	16	12	17	.2	15
August			42.4			47.6	38.8				6.6		11		2.3	16	9	2	10	14	5	15	10	19	.2	13
September			39.2			44.2	35.4				6.7		12		2.8	18	12	2	10	8	4	16	15	15	1.7	7
October			34.5			40.4	30.2				6.3		12		2.9	25	15	3	7	4	2	14	17	13	2.0	3
November			29.1			34.5	24.2				6.3		12		3.2	29	16	3	5	3	1	13	21	9	1.6	1
December			24.9			34.3	17.2				6.3		11		3.2	28	17	3	6	2	1	14	22	7	2.0	.4
Mean																										
Total											6.5		138		3.0										149	60
Number of years' observations			41							41						41										

[1] Mean of day.
[2] Day with 0.1 mm. or over.
[3] Force 9 or over.

Authority: Handbuch der Klimatologie. Bd. II, Berlin, 1935.

STATION, REYKJAVIK, ICELAND. LATITUDE 64°09′ N.; LONGITUDE 21°57′ W.

Month	Pressure	Temperature	Precipitation	Number of days with—				Wind directions									Mean wind force 0–12
	Daily mean [1]	Daily mean (°F.)	Average monthly (inches)	Precipitation	Snow [2]	Fog	Gale 9 up [2]	Percent of all observations from—									
								N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	
January	997.9	30	3.9	17	15.2	1.1	2.8	7	9	26	20	14	13	6	2	3	3.9
February	1000.0	30	3.1	15	11.7	2.1	1.8	6	7	27	21	15	14	5	2	3	4.0
March	1005.1	31	2.9	14	9.2	2.7	1.3	6	8	25	23	13	12	5	3	5	3.8
April	1009.2	36	2.4	13	4.9	2.5	.7	15	12	20	18	9	8	6	7	5	3.6
May	1013.1	43	1.9	14	1.9	3.0	.3	16	13	16	12	6	8	11	14	4	3.3
June	1011.7	49	1.9	14	-------	5.0	.3	17	7	8	10	9	13	14	16	6	3.1
July	1009.5	52	1.9	14	-------	4.0	-------	15	6	7	12	11	13	15	15	6	3.0
August	1009.1	51	2.0	13	-------	3.2	.3	15	8	12	14	9	10	11	14	7	3.0
September	1005.9	46	3.5	16	.4	2.6	.4	14	8	14	18	12	13	7	9	5	3.3
October	1005 1	39	3.5	15	3.2	3.3	1.0	11	9	24	21	12	10	5	4	4	3.4
November	1002.4	34	3.7	17	7.7	3.6	1.4	11	7	23	20	14	14	4	4	3	3.8
December	997.3	30	3.6	17	10.2	2.9	2.8	8	8	24	21	14	14	5	2	4	3.9
Year	1005.5	39	34.3	179	64.4	36.0	13.1	12	9	19	17	11	11	8	8	5	3.5

[1] At mean sea level in millibars.
[2] Average taken over 14 years, 1924–38. For remaining columns, mean taken over more than 10 years.

TABLE 12.—*Meteorological tables*—Continued

TION SABINE ISLAND, GREENLAND. LATITUDE 74°32′ N.; LONGITUDE 18°49′ W. HEIGHT ABOVE MEAN SEA LEVEL, 0 FEET

[Meteorological table compiled from 1 year's observations, 1869–70]

Month	Pressure at mean sea level, reduced to 32° F. and latitude 45°		Air temperature (°F).							Relative humidity (percent)	Cloud amount (0–10)	Rain			Wind										Number of days gales	Number of hours fogs
	Mean			Mean daily		Mean monthly		Extreme				Average fall (inches)	Number of hours	Maximum fall in 24 hours (inches)	Mean velocity (knots)	Percentage of observations from—										
	For month (mb.)	Daily amplitude (mb.)	Average [1]	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum							N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm		
uary	1,011	------	−11	----	----	------	------	19	−29	----	3.7	------	63	------	------	23	3	5	1	4	4	10	6	44	4	32
bruary	1,017	------	−11	----	----	------	------	14	−40	----	5.3	------	47	------	------	32	1	4	3	9	7	12	8	24	8	22
arch	1,024	------	−10	----	----	------	------	9	−29	----	4.2	------	43	------	------	46	0	1	1	8	3	11	4	26	7	6
pril	1,014	------	2	----	----	------	------	30	−25	----	5.1	------	38	------	------	40	1	1	1	9	5	7	10	26	10	37
ay	1,014	------	22	----	----	------	------	41	−1	----	5.2	------	58	------	------	15	2	9	8	25	3	9	3	26	3	77
ne	1,015	------	36	----	----	------	------	46	25	----	6.5	------	88	------	------	24	7	15	5	10	4	2	3	30	2	196
ly	1,008	------	39	----	----	------	------	56	30	----	3.9	------	72	------	------	9	4	10	9	14	5	4	4	41	0	208
ugust	1,016	------	33	----	----	------	------	53	21	----	4.5	------	37	------	------	14	6	1	4	18	6	12	10	29	0	130
ptember	1,013	------	24	----	----	------	------	41	11	----	5.0	------	34	------	------	39	3	2	4	4	4	3	11	32	4	81
ctober	1,014	------	7	----	----	------	------	24	−9	----	4.2	------	43	------	------	25	3	7	2	8	2	11	18	22	3	7
ovember	1,010	------	−1	----	----	------	------	16	−14	----	5.4	------	42	------	------	46	1	1	1	2	2	13	15	19	7	1
ecember	1,011	------	1	----	----	------	------	27	−18	----	6.3	------	71	------	------	46	1	3	4	13	1	7	11	14	7	10
Iean	1,014	------	11	----	----	------	------	----	----	----	4.9	------	636	------	------	30	3	5	4	10	4	9	9	28	55	807
otal	------	------	------	----	----	------	------	----	----	----	----	------	----	------	------	----	----	----	----	----	----	----	----	----	----	----
xtreme values	------	------	------	----	----	------	------	56	−40	----	----	------	----	------	------	----	----	----	----	----	----	----	----	----	----	----

[1] Mean of 24 hours.

The direction of the gales is almost invariably from N.

Authorities: Leipzig Die Zweite Deutsche Nord polarfahrt, 1869–70.

TATION, SCORESBY SOUND, GREENLAND. LATITUDE 70°30′ N.; LONGITUDE 23°00′ W. HEIGHT ABOVE MEAN SEA LEVEL, 55 FEET

Month	Pressure at mean sea level		Air temperature (°F.)						Relative humidity (percent)	Cloud amount (0–10)	Rain			Wind									Number of days, gales [2]	Number of days, fog
	Mean			Mean daily		Mean monthly		Extremes				Average fall (inches)	Number of days	Maximum fall in 24 hours (inches)	Mean force Beaufort scale	Percentage of observations from—										
	For month	Daily amplitude	Average [1]	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum							N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm.		
January	------	------	0.6	----	----	------	------	------	------	----	5.9	1.8	----	------	------	9	42	1	1	2	1	5	9	29	----	3
February	------	------	1.6	----	----	------	------	------	------	----	7.1	1.7	----	------	------	7	35	3	5	5	1	10	8	26	----	7
March	------	------	1.7	----	----	------	------	------	------	----	5.0	.6	----	------	------	12	34	4	3	5	2	9	7	25	----	5
April	------	------	9.6	----	----	------	------	------	------	----	6.8	1.5	----	------	------	13	23	2	3	7	1	7	13	30	----	9
May	------	------	24.1	----	----	------	------	------	------	----	5.3	.3	----	------	------	9	18	7	2	11	5	5	9	35	----	13
June	------	------	35.2	----	----	------	------	------	------	----	5.8	1.0	----	------	------	8	7	7	6	9	13	14	11	26	----	16
July	------	------	40.1	----	----	------	------	------	------	----	5.1	.6	----	------	------	10	5	0	6	21	6	20	3	30	----	10
August	------	------	38.0	----	----	------	------	------	------	----	5.5	.4	----	------	------	3	11	3	7	10	7	15	7	37	----	10
September	------	------	31.6	----	----	------	------	------	------	----	5.1	1.1	----	------	------	7	16	17	0	13	0	5	1	40	----	4
October	------	------	19.4	----	----	------	------	------	------	----	5.9	1.1	----	------	------	11	43	3	4	1	0	7	11	21	----	3
November	------	------	9.1	----	----	------	------	------	------	----	5.3	1.0	----	------	------	14	24	1	1	2	2	10	22	23	----	8
December	------	------	4.1	----	----	------	------	------	------	----	6.2	1.5	----	------	------	14	20	1	1	9	3	7	15	30	----	----
Mean	------	------	17.6	----	----	------	------	----	----	----	5.7	12.6	----	------	------	----	----	----	----	----	----	----	----	----	----	93
Total	------	------	------	----	----	------	------	----	----	----	----	----	----	------	------	----	----	----	----	----	----	----	----	----	----	----
Number of years observations	------	------	5	----	----	------	------	----	----	----	5	4	----	------	------	----	----	----	----	----	----	----	----	5	----	----

[1] Mean of day.

[2] Force 9 or over.

Authority: Handbuch der Klimatologie. Bd. II, Berlin, 1935.

TABLE 12.—*Meteorological tables*—Continued

STATION, STYKKISHOLMUR, ICELAND. LATITUDE 65°05′ N., LONGITUDE 22°46′ W. HEIGHT ABOVE MEAN SEA LEVEL, 82 FEET

[Meteorological table compiled from 10–59 years' observations, 1874–1932]

Month	Pressure at mean sea level, reduced to 32° F. and latitude 45°		Air temperature (°F.)							Relative humidity (percent)	Cloud amount (0 to 10)	Rain			Wind										Number of days gales [4]	No. of days fogs
	Mean			Mean daily		Mean monthly		Extreme							Mean velocity (knots)	Percentage of observations, from—										
	For month (mb.)	Daily amplitude (mb.)	Average [1]	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum			Average fall (inches)	Number of days [2]	Maximum fall in 24 hours (inches) [3]		N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm		
January	998	------	29	34	24	45	10	49	−21	----	------	3.0	19	2.0	------	12	9	29	13	11	11	8	2	5	3	0.2
February	1000	------	28	33	23	44	19	49	−9	----	------	2.5	18	2.0	------	9	7	27	14	14	14	7	2	6	3	.5
March	1005	------	28	35	24	45	19	53	−13	----	------	1.9	16	1.3	------	12	9	25	14	16	10	5	1	8	2	.5
April	1010	------	33	39	29	49	16	57	−6	----	------	1.5	15	1.2	------	20	16	25	10	10	4	5	2	8	2	.7
May	1014	------	40	46	35	55	26	68	17	----	------	1.3	14	.8	------	21	18	24	7	5	4	8	6	7	1	
June	1012	------	47	53	42	61	34	68	28	----	------	1.5	14	1.3	------	22	8	18	6	10	5	10	7	14	.2	2
July	1010	------	50	56	45	63	39	73	33	----	------	1.4	12	.8	------	18	7	22	6	15	4	9	7	12	.2	1
August	1010	------	49	55	44	62	37	72	30	----	------	1.6	13	1.0	------	21	10	22	7	10	3	9	6	12	.5	1
September	1006	------	45	50	40	58	31	64	24	----	------	2.7	17	2.0	------	19	9	21	10	13	8	8	3	9	1	.7
October	1006	------	39	43	34	52	24	59	15	----	------	3.0	17	1.5	------	19	10	23	13	12	8	5	2	8	2	.3
November	1003	------	33	38	29	48	16	53	0	----	------	2.8	18	1.6	------	19	9	23	14	11	11	5	2	6	2	.3
December	998	------	29	35	25	45	13	52	−6	----	------	2.4	18	1.0	------	15	9	21	16	13	11	7	2	6	2	.2
Mean	1006	------	38	43	33	[5] 65	[5] 4	----	----	----	------	----	----	----	------	17	10	23	11	12	8	7	3	9	----	----
Total	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Extreme values	----	----	----	----	----	----	----	73	−21	----	------	25.6	191	----	------	----	----	----	----	----	----	----	----	----	19	8
Number of years' observations	51	------	47	59						----	------	----	----	2.0	------	----	----	----	----	----	----	----	----	----	----	----
										----	------	50	48	59	------	10									35	35

[1] Reduced to mean of 24 hours.
[2] Day with trace or more rain.
[3] Maximum fall during the 24 hours from one morning observation to the next.
[4] Force 9 or over on Beaufort scale.
[5] Mean of highest each year and lowest each year.

Hours of observation 0800, 1400, 2100.
Authorities: MS. data supplied by Vedurstofan, Reykjavik.

STATION: TEIGARHORN, ICELAND. LATITUDE 64°41′ N.; LONGITUDE 14°22′ W. HEIGHT ABOVE MEAN SEA LEVEL, 59 FEET

[Meteorological table compiled from 9–59 years' observations, 1874–1932]

Month	Pressure at mean sea level reduced to 32° F. and latitude 45°		Air temperature °F							Relative humidity (percent)	Cloud amount (0–10)	Rain			Wind										Number of days gales [4]	Number of days fogs
	Mean			Mean daily		Mean monthly		Extreme							Mean velocity (knots)	Percentage of observations, from—										
	For month (mb.)	Daily amplitude (mb.)	Average [1]	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum			Average fall (inches)	Number of days [2]	Maximum fall in 24 hours (inches) [3]		N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm		
January	1000	------	30	36	25	47	11	56	−14	----	------	5.1	15	2.4	------	30	11	10	5	9	5	0	3	27	1	2
February	1002	------	30	36	26	46	12	56	−3	----	------	3.9	14	2.3	------	22	10	13	5	14	5	0	5	26	.9	2
March	1006	------	30	36	25	48	9	59	−7	----	------	3.1	12	4.6	------	26	11	7	3	10	6	0	4	33	.9	2
April	1010	------	35	41	29	53	16	60	−1	----	------	3.2	11	1.9	------	34	9	14	5	9	2	0	2	25	.7	4
May	1014	------	40	47	34	60	25	74	13	----	------	2.9	10	2.1	------	26	10	27	2	6	2	0	2	25	.3	4
June	1013	------	45	53	40	66	33	78	24	----	------	2.6	9	4.3	------	16	5	27	3	8	3	0	3	35	.1	8
July	1010	------	48	56	43	67	38	79	33	----	------	2.6	9	4.3	------	12	3	23	2	8	9	0	2	41	.2	10
August	1009	------	47	55	43	65	37	74	27	----	------	3.2	10	4.9	------	18	9	22	2	7	5	0	1	36	.3	12
September	1007	------	44	50	39	60	30	69	22	----	------	4.9	13	2.9	------	26	9	14	2	9	6	0	3	31	.3	10
October	1007	------	38	43	34	54	23	65	11	----	------	5.0	13	3.5	------	30	13	11	2	6	4	0	3	31	.3	7
November	1004	------	34	38	29	49	16	60	1	----	------	4.4	14	2.9	------	28	12	8	4	9	6	0	5	28	.6	4
December	1000	------	31	36	26	47	14	56	−5	----	------	5.5	15	3.3	------	25	11	11	4	7	6	0	4	32	.7	2
Mean	1007	------	38	44	33	[5] 69	[5] 5	----	----	----	------	----	----	----	------	24	10	16	3	8	5	0	3	31	.5	2
Total	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Extreme values	----	----	----	----	----	----	----	79	−14	----	------	46.4	145	----	------	----	----	----	----	----	----	----	----	----	7	65
Number of years' observations	51	------	47	59						----	------	----	----	4.9	------	----	----	----	----	----	----	----	----	----	----	----
										----	------	50	48	59	------	9									35	35

[1] Reduced to mean of 24 hours.
[2] Day with trace or more rain.
[3] Maximum fall during the 24 hours from one morning observation to the next.
[4] Force 9 or over on Beaufort scale.
[5] Mean of highest each year and lowest each year.

Hours of observation 0800, 1400, 2100.
Authorities: MS. data supplied by Vedurstofan, Reykjavik.

TABLE 12.—*Meteorological tables*—Continued

STATION, UPERNIVIK, GREENLAND. LATITUDE 72°47′ N.; LONGITUDE 56°07′ W. HEIGHT ABOVE MEAN SEA LEVEL, 59 FEET

[Meteorological table compiled from 31–52 years' observations]

Month	Pressure at mean sea level, reduced to 32° F. and latitude 45°		Air temperature (° F.)								Relative humidity (percent)	Cloud amount (0–10)	Rain (percent)			Wind										Number of days gales [5]	Number of days fogs
	Mean		Average [2]	Mean daily		Mean monthly		Absolute					Average fall (mm.)	Number of days [3]	Maximum fall in 24 hours [4] (mm.)	Mean force, Beaufort scale	Percentage of observations from—										
	For month (mb.)	Daily amplitude [1] (mb.)		Maximum	Minimum	Maximum	Minimum	Maximum	Minimum								N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.	Calm		
January	1006	0	−7	−1	−13	27	−27	55	−39	71	4.4	11	4	21	1.9	10	11	31	2	4	9	1	1	31	0.3	2
February	1009	0	−10	−3	−16	28	−30	60	−44	70	4.3	12	4	50	1.7	9	11	30	1	5	7	1	1	35	.4	2
March	1013	.1	−7	2	−13	31	−29	47	−41	71	4.5	17	6	53	1.8	11	10	25	2	5	9	1	1	35	.6	2
April	1016	.3	7	15	−1	37	−18	50	−30	74	5.1	15	5	46	1.7	15	10	22	2	5	9	1	1	35	.1	4
May	1016	.1	25	32	19	45	4	56	−8	84	6.6	15	7	40	1.8	23	8	15	2	5	11	2	2	32	.1	5
June	1012	.1	35	42	30	53	23	63	10	83	6.9	13	6	33	2.2	25	4	8	2	7	14	5	6	29	.2	9
July	1011	.1	41	48	35	59	29	68	19	81	6.3	24	7	47	1.9	21	3	8	2	5	15	4	7	35	.4	11
August	1011	0	41	47	36	58	30	69	24	80	6.9	29	8	37	1.8	19	4	14	2	5	15	3	4	34	.5	7
September	1008	0	33	38	29	50	21	69	13	83	7.1	27	10	45	2.3	12	8	30	4	6	11	2	3	25	.4	2
October	1009	0	25	29	21	43	10	63	0	79	7.1	28	11	32	2.5	8	8	41	5	7	10	2	4	16	.7	1
November	1009	0	15	19	10	37	−4	53	−17	84	7.1	27	10	30	2.6	12	10	38	4	4	7	4	2	17	.6	1
December	1006	0	2	7	−3	32	−19	48	−35	77	5.5	14	6	30	2.2	11	11	37	2	4	7	2	2	24	.4	2
Mean	1010	0	17	23	11	[6] 61	[6] −33			78	6.0		232	84		2.0	15	8	25	2	5	10	2	3	30	5	48
Total															53											
Extreme values								69	−44																	
Number of years' observations	52	52	52	40	48	40	48	40	48	31	50	50	50	50	50	52										

[1] Range between 0800 and 1400.
[2] Mean of day.
[3] Day with 0.1 mm. or more rain.
[4] Maximum fall during the 24 hours from one morning observation to the next
[5] Force 9 or over.
[6] Mean of highest each year and lowest each year.

Hours of observation, 0800, 1400, 2100.

Authorities: MS. data supplied by Danish Meteorological Institute, Copenhagen.

STATION, VESTMANNAEYJAR, ICELAND. LATITUDE 63°24′ N., LONGITUDE 20°17′ W. HEIGHT ABOVE MEAN SEA LEVEL, 400 FEET

[Meteorological table compiled from 8–55 years' observations, 1878–1932]

Month	Pressure at mean sea level reduced to 32° F. and latitude 45°		Air temperature (° F.)							Relative humidity (percent)	Cloud amount (0–10)	Rain			Wind									Number of days gales [4]	Number of days fogs
	Mean		Average [1]	Mean daily		Mean monthly		Extreme				Average fall (inches)	Number of days [2]	Maximum fall in 24 hours (inches) [3]	Mean velocity (knots)	Percentage of observations, from—									
	For month (mb.)	Daily amplitude (mb.)		Maximum	Minimum	Maximum	Minimum	Maximum	Minimum							N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm		
January	998	------	35	39	30	47	15	50	−5	----	------	6.1	20	2.2	------	12	3	20	15	15	13	12	9	1	5	2
February	1000	------	34	40	30	46	16	51	5	----	------	4.8	18	2.3	------	10	3	23	20	16	11	9	8	0	5	2
March	1005	------	35	40	30	48	15	51	−6	----	------	4.4	17	3.6	------	12	2	20	24	14	12	8	8	0	4	2
April	1009	------	39	44	34	51	21	55	4	----	------	3.7	17	1.9	------	18	2	20	22	10	6	9	12	1	2	3
May	1013	------	44	50	39	57	29	65	15	----	------	3.2	15	2.5	------	11	3	21	21	11	7	12	13	1	2	5
June	1012	------	48	55	44	62	38	70	31	----	------	3.2	15	1.3	------	6	2	13	22	14	11	19	12	1	.5	8
July	1010	------	51	58	47	64	42	72	37	----	------	3.0	15	1.7	------	6	2	14	22	17	13	14	11	1	.3	10
August	1009	------	50	57	46	62	39	69	31	----	------	2.9	14	1.6	------	8	3	20	25	13	7	12	12	0	.9	6
September	1006	------	47	51	42	56	34	62	27	----	------	5.5	18	2.8	------	16	3	13	16	13	14	11	14	0	2	5
October	1005	------	42	45	37	51	26	56	17	----	------	5.6	19	2.4	------	19	5	23	18	9	8	7	10	1	3	4
November	1002	------	37	42	33	48	20	52	3	----	------	5.2	19	2.3	------	19	4	20	11	12	11	13	10	0	4	3
December	998	------	34	40	31	47	17	51	0	----	------	5.5	19	2.0	------	15	3	18	16	14	13	11	10	0	5	2
Mean	1006	------	41	47	37	[5] 65	[5] 9	----	----	----	----	53.1	206	----	------	13	3	19	19	13	10	11	11	1	34	52
Total														3.6												
Extreme values								72	−6																	
Number of years' observations	47	------	43	49	49	55				----	------	48	38	49	------	8									35	35

[1] Reduced to mean of 24 hours.
[2] Day with trace or more rain.
[3] Maximum fall during the 24 hours from one morning observation to the next.
[4] Force 9 or over on Beaufort scale.
[5] Mean of highest each year and lowest each year.

Hours of observation 0800, 1400, 2100.
Authorities: MS. data supplied by Vedurstofan, Reykjavik.

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HYDROGRAPHIC OFFICE
U. S. NAVY DEPARTMENT

October 20, 1943.

WEATHER SUMMARY, SUPPLEMENT "B" TO H. O. PUBLICATION NO. 252 - NAVAL AIR PILOT, GREENLAND - ICELAND

This Weather Summary dated 1943 cancels the CONFIDENTIAL Weather Summary dated 1941 which is now incorporated in H. O. Publication No. 252. The 1941 Weather Summary should be destroyed by burning. No report necessary.

Make the following changes to page IX of the List of Effective Pages and Index included in Revision No. 1 to H. O. Publication No. 252:

In column headed "Text Pages" under headings "Number" and "Date" opposite the line reading "Weather Summary for Greenland and Iceland", strike out figures "1-46" and "12/41" and insert "1-87" and "1943."